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(54) **MOTORIZATION DEVICE**

(57) Device (1), to be mounted in correspondence with an installation (300) with a first roller group (3) comprising a tubular winding/unwinding shaft (4) for a roll-up element (5) and with at least one second roller group (30) comprising a further tubular winding/unwinding shaft (30) for a further roll-up element (32), and to be used preferably to drive the movement of said further tubular winding/unwinding shaft (31) of said further roll-up element (32), said drive device (1) being characterized in that it comprises:

- a casing (28), preferably tubular in shape, which is configured to be removably inserted inside said tubular shaft (4) of said first roller group (3),
- a head (25) which is associated with said casing (28) so as to protrude, at least in part, from one end of the

tubular shaft (4) in which the casing (28) is intended to be removably inserted, said head (25) being configured for and/or being intended to be fixed to an external support structure (7),

- an actuator (18) which is housed inside said casing (28),
- means (24) mounted on said head (25) and/or on said casing (28) and configured to idle support the tubular shaft (4),
- a motorized output member (29) projecting from said casing (28) and which is actuated in rotation by said actuator (18), said motorized output member (29) also being configured to project from one end of the tubular shaft (4) in which the casing (28) is intended to be removably inserted and being also configured to be engaged by motion transmission means (50).

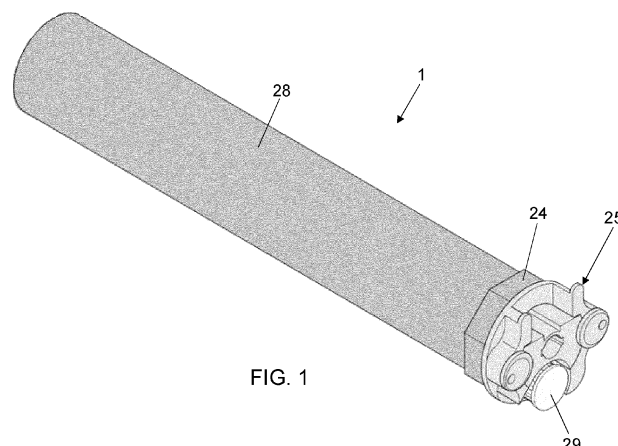


FIG. 1

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Description

FIELD OF THE TECHNIQUE

[0001] The present invention relates to a drive device to be mounted in correspondence with an installation comprising a first roller group, preferably motorized, for example a roller shutter, and a second roller group, for example a blackout/filtering curtain or mosquito net. The drive device is provided to drive the movement of the second roller group which, preferably, acts at the same window, door, glass wall or opening in general in which the first roller group operates.

[0002] The present invention also relates to an installation in which said drive device is mounted and comprising a first roller group, preferably motorised, for example a roller shutter, and a second roller group, for example a blackout/filtering curtain or mosquito net.

STATE OF THE ART

[0003] Both outdoor and indoor installations are known - for example to be mounted in correspondence with windows, doors, glazed windows or other openings in general - which provide for the use of rolling shutters. In particular, these installations provide for the use of a motorized shutter, which in the open condition is wound around a motorized tubular shaft and in the total or partial closed condition it is unwound by said shaft, preferably sliding along side guides, thus covering all or part of the light from the window, door, glazed window or other opening in general.

[0004] The current market need is to provide, in correspondence with the roller shutter with a blackout curtain or a roller insect screen. In particular, for this purpose, a further shaft is also mounted inside the box containing the motorized winding shaft of the shutter, around which the blackout curtain or fly screen is wound and unwound. In these known solutions, the spaces inside the housing box for both the rolling shutter and the blackout curtain or flyscreen are particularly small and, in particular, the motorisation of the shaft around which the blackout curtain or flyscreen is wound and unwound is particularly complicated.

[0005] Generally, a dedicated motor is used to drive the shaft around which the blackout or fly screen is wound and unwound which - so as to optimize the spaces inside the box where the winding shaft of the roller blind is placed - is inserted inside the same tree around which the blackout curtain or mosquito net is wound and unfolded. Furthermore, again with a view to optimizing the spaces inside the box in which the roller shutter winding shaft is also positioned, a shaft with a particularly small diameter is used to roll up/unwind the blackout blind or fly screen and, therefore, the motors used - which, as mentioned, are housed inside the shaft itself - are particularly compact (for example they have a diameter of about 25 mm) and, in the case of smaller dimensions, they have the

drawback that they are generally not able to supply an output torque sufficient to cause the rotation of the shaft around which the blackout curtain or fly screen is wound/unwound. In particular, in some cases larger motors would be required, which would thus be able to develop a greater output torque, however the dimensions of the shaft around which the blackout curtain or flyscreen is wound/unwound and/or the installation inside the dumpster do not allow it.

OBJECTS OF THE INVENTION

[0006] The object of the invention is to propose a device, to be mounted in correspondence with an installation comprising a first roller group and a second roller group, and provided for the motorization of the second roller group, which eliminates all the drawbacks found in the known solutions and which, in particular, can be installed in conditions where the available spaces are limited.

[0007] Another object of the invention is to propose a device to be mounted in correspondence with an installation comprising a roller shutter, preferably motorized, to motorise the movement of a blackout/filtering curtain or mosquito net or similar acting on the same window, door, glass wall or opening in which the roller shutter acts.

[0008] Another object of the invention is to propose a device which allows to move the shaft around which the blackout/filtering curtain or mosquito net is wound or unfolded, while optimizing the installation dimensions inside the box and without the dimensional and performance limitations - present in the known solutions - for the motorisation of said winding/unwinding shaft of the blackout/filtering curtain or flyscreen.

[0009] Another object of the invention is to propose a device which is simple to install, even by unskilled personnel.

[0010] Another object of the invention is to propose a device which is easy to program and manage.

[0011] Another object of the invention is to propose a device which is independent, autonomous and/or additional to the drive unit of the first roller group.

[0012] Another object of the invention is to propose a device which can also be controlled remotely by smartphone both to command the operation of the control device itself and to verify the correct execution of the commands received.

[0013] Another object of the invention is to propose a device which is an improvement and/or alternative to the traditional ones.

[0014] Another object of the invention is to propose a device which can be obtained simply, quickly and with low costs.

[0015] Another object of the invention is to propose an apparatus which allows to move at least two shafts, around which respective roll-up elements are wound and unwound, optimizing the overall dimensions of installation inside the body which houses both said at least two

shafts and without particular limitations in terms of driving torque generated at the output of the movement motors of said at least two shafts.

[0016] Another object of the invention is to propose an installation for at least two roller groups which is particularly compact in size, which is simple and quick to assemble and install, easy to program and manage, as well as obtainable simply, quickly and with low costs.

SUMMARY OF THE INVENTION

[0017] All of these objects, considered individually or in any combination thereof, and others which will result from the following description are achieved, according to the invention, with a drive device as defined in claim 1 or with an apparatus as defined in claim 7.

DESCRIPTION OF THE FIGURES

[0018] The present invention is hereinafter further clarified in some of its preferred embodiments shown for purely exemplifying and non-limiting purposes with reference to the attached table of drawings, in which:

figure 1	shows a perspective view the drive device according to the invention in a first embodiment,
figure 2	shows in perspective view an installation with a first roller shutter unit of the roller shutter type, with a second roller group of the roller blind/flyscreen type and with a device according to the invention for the motorization of the second roller group,
figures 3a - 3e figure 4a	show some detailed details of fig. 2, shows in schematic view an installation with a first roller shutter assembly of the roller shutter type, with a second roller shutter assembly of the roller blind/insect screen type and with a device of the type of fig. 2 for the motorization of the second roller group, in a condition in which the rolling shutter is mostly unrolled while the curtain/flyscreen is completely rolled up,
figure 4b	shows the same view fig. 4a in a condition in which the roller shutter is completely rolled up while the curtain or insect screen is largely unwound,
figure 4c	shows the same view in fig. 4a in a condition in which the rolling shutter is more unfolded than the curtain/flyscreen,
figure 4d	shows the same view fig. 4a in a condition in which the awning/fly screen is more unfolded than the rolling shutter,
figure 5	shows a perspective view of the drive device according to the invention in a

figure 6

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figures 7a - 7e

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figure 8

figure 9

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second and different embodiment, shows a perspective view of an installation with a first roller shutter assembly of the roller shutter type, with a second roller shutter assembly of the roller blind/insect screen type and with a device of the type of fig. 5 for the motorisation of the second roller group, show some detailed details of fig. 6, is a schematic view of an apparatus according to the invention of the type envisaged in the installation of fig. 2, and is a schematic view of an apparatus according to the invention of the type envisaged in the installation of fig. 6.

DETAILED DESCRIPTION OF THE INVENTION AND OF SOME PREFERRED EMBODIMENTS ITS

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[0019] As can be seen from the figures, the drive device according to the invention, globally indicated with the reference number 1, which is applied/assembled, in the illustrated example, in correspondence of an installation 300 comprising a first roller group 3, for example of the roller shutter type, and a second roller group 30, for example of the blackout/filtering curtain or mosquito net type.

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[0020] Preferably, both the first roller group 3 and the second roller group 30 act in correspondence with the same window 100, door, glass wall, wall or any opening (even only for the passage of light or air).

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[0021] The drive device 1 is configured to drive the movement of the second roller group 30, for example of the type comprising a blackout/filtering cloth or a fly screen.

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[0022] Conveniently, the first roller group 3 is of the traditional type. Preferably, the first roller group 3 is a rolling shutter of the roller type.

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[0023] Conveniently, the first roller group 3 comprises a tubular shaft 4 and a roll-up element 5 which has an edge fixed to the tubular shaft and which, following the rotation of the tubular shaft 4, can be wrapped around said shaft and unwound by it.

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[0024] The roll-up element 5 is a roll-up covering element and can be a sheet or, preferably, it can be of the type with a roll-up shutter and comprise a plurality of parallel strips, articulated to each other, which wrap around the tubular shaft 4.

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[0025] Preferably, the first roller group 3 is motorized and, in particular, the tubular shaft 4 is motorized in rotation around its longitudinal development axis X_1 .

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[0026] Conveniently, the winding/unwinding of the roll-up element 5 around the tubular shaft 4 can take place both along a substantially vertical direction and along a more or less inclined direction with respect to the vertical or horizontal. Suitably, the winding/unwinding of the roll-up element 5 around the tubular shaft 4 can take place

along lateral guides for said roll-up element 5.

[0027] The tubular shaft 4 can be, for example, a shaft which, suitably, can have any cross section. Preferably, the tubular shaft 4 can have a circular or polygonal section, for example hexagonal, octagonal or the like.

[0028] Conveniently, at least one second roller group 3 is also provided at the first roller group 3 which preferably acts at the same window 100, door, glass wall, wall or opening (even only for the passage of light or air) in which the first roller group 3 acts. Conveniently, in another possible embodiment not shown, the second roller group 30 could act on a window 100, door, glass wall, wall or opening (even only for the passage of light or air), or on a part thereof, which is different from the one in which the first roller group 3 acts.

[0029] Conveniently, the second roller group 30 is of the traditional type. Preferably, the second roller group 30 comprises a blackout/filtering curtain of the roller type or a mosquito net of the roller type.

[0030] Conveniently, the second roller group 30 comprises a further (second) tubular shaft 31 rotating around its longitudinal development axis X_2 and a further (second) roll-up element 32 which has an edge fixed to the further tubular shaft 31 and which, following of the rotation of the further tubular shaft 31, it can be wound around said shaft and unwound by it.

[0031] The further roll-up element 32 can be a roll-up covering element and, preferably, it can be a sheet in a darkening and/or filtering fabric. Preferably, the further roll-up element 32 can use a fabric of the "screen" type, i.e. with fabric that has a perforated texture which allows to see outside and not vice versa. Preferably, the further roll-up element 32 can use a mesh fabric which acts as a mosquito net. Conveniently, in a possible embodiment, the further roll-up element 32 can comprise a plurality of mutually articulated horizontal slats.

[0032] The further tubular shaft 31 of the second roller group 30 is motorized in rotation around its longitudinal development axis by means of the drive device 1 which is installed and housed inside the tubular shaft 4 of the first roller group 3.

[0033] Suitably, the winding/unwinding of the further roll-up element 32 around its further tubular shaft 31 can take place both along a substantially vertical direction and along a more or less inclined direction with respect to the vertical. Conveniently, the winding/unwinding of the further tubular shaft 31 around its tubular winding shaft 32 can take place along lateral guides for said further tubular shaft 31.

[0034] The further tubular shaft 31 of the second roller group 30 can be, for example, a shaft which, suitably, can have any cross-section. Preferably, the further tubular shaft 31 can have a cross section of circular or polygonal shape, for example hexagonal, octagonal or similar.

[0035] Conveniently, the internal diameter of the further tubular shaft 31 of the second roller group 30 is smaller than the internal diameter of the tubular shaft 4 of the first roller group 3. For example, the internal diameter of

said further tubular shaft 31 of the second roller group 30 can have a diameter of less than about 15 mm, while the internal diameter of the tubular shaft 4 of the first roller group 3 is equal to or greater than about 25-50 mm.

[0036] Conveniently, the cross sections of the tubular shaft 4 and of the further tubular shaft 31 can be the same or different. Conveniently, the rotation axes X_1 and X_2 respectively of the tubular shaft 4 and of the further tubular shaft 31 are parallel to each other.

[0037] Preferably, the second roller group 30 can comprise a rigid crosspiece 33 which is associated with the further roll-up element 32 at the opposite edge with respect to that associated with the further tubular shaft 31. Conveniently, the rigid crosspiece 33 can consist of a metal or plastic profile and can have any section.

[0038] Conveniently, the second roller group 30 can comprise two heads 37, each of which is associated with one end of the further tubular shaft 31. In particular, the heads 37 are fixed to an external structure and are configured to idly support said further tubular shaft 31 at the respective ends.

[0039] Conveniently, the second roller group 30 can also comprise an external structure for the further tubular shaft 31 which is configured to be mounted to a fixed structure (not shown), for example to a wall surrounding the opening (window, door, glazed, wall, etc.) to be covered.

[0040] Preferably, the further tubular shaft 31 can be mounted inside a compartment or box above the gate and, preferably, inside the same compartment or box in which the tubular shaft 4 of the first roller group 3 is also housed. Preferably, the external structure for the further tubular shaft 31 can comprise at least a pair of side brackets which suitably support the further tubular shaft 31 at their ends and are associated directly, or through other components, with a fixed structure, for example to a wall that surrounds the opening (window, door, stained glass window, etc.) to be covered.

[0041] Conveniently, both the tubular shaft 4 and the further tubular shaft 31 are housed inside the same compartment, preferably inside the same box and, even more preferably, inside the same section bar, and preferably they can form a finished monobloc ready for installation.

[0042] Conveniently, a drive unit 80 is also provided which is configured to cause rotation of the tubular shaft 4 in both directions, thus allowing winding and unwinding of the roll-up element 5 having an edge fixed to said shaft.

[0043] In particular, the drive unit 80, to cause rotation of the tubular shaft 4 in both directions, is inserted into the shaft itself externally and independently of the drive device 1 (cf. fig. 1, 2, 4a - 4d or 8) or it can be provided inside the drive device 1 (cf. figs. 5, 6 and 9).

[0044] Preferably, the drive unit 80 comprises a traditional driving/driving tubular electric motor, preferably of the single-phase asynchronous type. Preferably, said drive unit 80 also comprises power supply means (for example a battery) for said electric motor and a command and control unit for said motor.

[0045] The drive unit 80, inserted inside the tubular shaft 4 separately from the drive device 1 or inside said drive device 1, is configured to cause the rotation, in particular to drive the rotation of said tubular shaft 4. In particular, the drive unit 80 is also provided with a motorized output element 82, for example a pin with an output pinion, to which a towing adapter (pulley) 8' of the shaft is suitably coupled tubular shaft 4, to thus cause rotation of the latter around the longitudinal development axis X_1 of the tubular shaft 4.

[0046] Conveniently, in the embodiment in which the drive unit 80, to cause rotation in both directions of the tubular shaft 4, is inserted into the shaft itself externally and independently of the drive device 1 (see fig. 1, 2, 4a - 4d or 8), the drive unit 80 comprises a head 35 which is suitably fixed with any known system to an external structure 7, is preferably fixed to a wing bracket 16 of the latter. Conveniently, moreover, in this embodiment, a rotating element and/or non-driven adapter 36 can be mounted at the head 35 of the drive unit 80 to support the tubular shaft 4 in an idle manner (i.e. so as to decouple the rotation of the shaft 4 by the drive unit 80).

[0047] Conveniently, the external structure 7 is configured to be mounted on a fixed structure (not shown), for example on a wall that surrounds the opening (window, door, glass wall, wall, etc.) to be covered. Preferably, the external structure 7 can be defined or mounted inside a compartment or box above the passage. Preferably, this external structure 7 can comprise at least a pair of lateral brackets 16 which are associated directly, or through other components, with a fixed structure, for example with a wall that surrounds the opening (window, door, glass wall, etc.) to cover.

[0048] Conveniently, in a possible embodiment not shown, the first roller group 3 can comprise manually actuated and actuated means configured to cause rotation of the tubular shaft 4 in both directions about the axis X_1 . Conveniently, these manually actuated and actuated means for causing rotation of the tubular shaft 4 in both directions can consist of a traditional hand-operated chain or winch.

[0049] Inside the tubular shaft 4 of the first roller group 3 is inserted the device 1 for motorizing the movement of the second roller group 30, in particular for motorizing the rotation of the further tubular shaft 31 around its longitudinal development axis X_2 so as to thus cause the winding/unwinding of the further tubular shaft 31 around said further tubular winding shaft 32.

[0050] Preferably, in a first possible embodiment (cf. fig. 1, 2, 4a - 4d and 8) at one end of the tubular shaft 4 the drive unit 80 of the tubular shaft 4 is inserted and housed, while at the other (opposite) end of the tubular shaft 4 the drive device 1 is inserted and housed to drive the rotation of the further tubular shaft 31. Suitably, therefore, in this case, the drive device 1 is substantially independent and autonomous - both from a constructive and positioning point of view and from an operational functioning point of view - with respect to the possible drive

unit 80 of the first roller group 3.

[0051] Preferably, in a different/second possible embodiment (cf. fig. 5, 6 and 9), the drive device 1 for driving the rotation of the further tubular shaft 31 also comprises the drive unit 80 for the tubular shaft 4 inside which the same drive device 1 is inserted. In particular, the drive unit 80 of the tubular shaft 4 is also provided inside the drive device 1. Therefore, the drive device 1 is suitably inserted and housed at the same end of the tubular shaft 4 to drive both the rotation of the further tubular shaft 31 and the rotation of said tubular shaft 4 inside which the drive device 1 itself is inserted.

[0052] Conveniently, the drive device 1 comprises:

- a casing 28, preferably tubular in shape, configured to be removably inserted inside the tubular shaft 4 of the first roller group 3,
- an actuator 18 which is housed inside the casing 28,
- a motorized output member 29 which protrudes from the casing 28 and which is actuated, in particular is actuated in rotation, by said actuator 18.

[0053] Conveniently, the actuator 18 of the drive device 1 is configured to actuate in rotation in both directions member 29 about a longitudinal axis X_3 which, preferably, is parallel to the axes X_1 and X_2 .

[0054] The motorized output member 29 of the drive device 1 also emerges from the outside of the tubular shaft 4. In particular, the output member 29 is configured to exit from one end of the tubular shaft 4 in which the casing 28 is intended to be removably inserted and is also configured to be engaged by motion transmission means 50.

[0055] Preferably, the actuator 18 of the drive device 1 is a driving/actuating tubular electric motor, preferably of the single-phase asynchronous type.

[0056] Conveniently, the casing 28 of the drive device 1 can be removably inserted inside the tubular shaft 4. Conveniently, it is understood that the shape and dimensions of the casing 28 are not linked to those of the tubular shaft 4 although they must obviously be compatible with those. In particular, the casing 28 has a shape and dimensions suitable for allowing its insertion and removable housing inside the tubular shaft 4.

[0057] The drive device 1 comprises a head 25 which is associated with one end of the casing 28 so to protrude - at least in part and preferably in full - from one end of the tubular shaft 4 in which the casing 28 is intended to be removably inserted. The head 25 being configured for and/or being intended to be fixed to an external structure 7.

[0058] Conveniently, the device 1 comprises means - preferably at least one rotating element 24 comprising an adapter - which are mounted on the head 25 and/or on the casing 28 and which are configured to support the tubular shaft 4 idly (i.e. so as to decouple the rotation of the tubular shaft 4 from the head 25 and from the casing 28). Preferably, said means are configured to allow the

casing 28 to be housed inside the tubular shaft 4 in an idle manner, i.e. so as to decouple the rotation of the tubular shaft 4 from the casing 28, thus allowing said tubular shaft 4 to rotate around its longitudinal development axis X_1 while the casing 28 remains fixed/still. Conveniently, the rotating element 24 is interposed between the casing 28 or the head 25 of the device 1 and the tubular shaft 4. Conveniently, said means comprise a rotating element 24 which is mounted at the head 25, which is intended to be integral in rotation with the tubular shaft 4 and which is configured to be idle (i.e. be uncoupled in rotation) with respect to the head 25 and the casing 28. In particular, said element 24 is rotatable with respect to the fixed head 25 and supports the tubular shaft 4 at one end thereof. In more detail, the head 25 comprises a body which is fixed (ie does not rotate) and furthermore, around a portion of the head 25 and/or of the casing 28, a rotating element 24 is provided which is made integral in rotation with the tubular shaft 4 and which rotates with respect to the fixed head 25. Conveniently, the rotating element 24 also allows the casing 28 to be kept centered inside the tubular shaft 4. Conveniently, the rotating element 24 can comprise an adapter for the assembly of the tubular shaft 4 and which thus allows coupling with the various shapes of the cross section of the shaft 4.

[0059] Furthermore, the device 1 comprises means 39 for fixing the head 25 to the external structure 7, preferably to a side bracket 16 of said external structure 7. Preferably, the means 39 comprise any known system for fixing the head 25 to the external structure 7, preferably for fixing to the wing bracket 16 of the latter. Conveniently, the fastening means 39 can comprise a protruding rod (for example with a rectangular cross-section) or at least two jaws which laterally grip an external portion (ie the one intended to always remain outside the tubular shaft 4) of the head 25. Conveniently, at least one first jaw is configured to be fixed to the side bracket, preferably by means of mechanical locking devices (for example screws or bolts with corresponding nuts), while the other (second) jaw is configured to be fixed to the first jaw, to thus externally wrap - at least in part - the external portion of the head 25.

[0060] Preferably, the drive device 1 can also act as a support for the tubular shaft 4 at one end of the latter.

[0061] Conveniently, the motorized output member 29 of the drive device 1 comprises a gear or a pulley which is actuated in rotation by the actuator 18 contained in the casing 28 of the device itself. Preferably, the motorized output member 29 of the drive device 1 comprises a pin integral in rotation with a gear or a pulley.

[0062] Conveniently, a further member 40 is provided which is integral in rotation with the further tubular shaft 31. Advantageously, the further member 40 is configured to be mounted on the further tubular shaft 31, preferably at one end thereof, or it can be integrated in said further tubular shaft 31. Preferably, the further member 40 can be defined by a further pulley or toothed wheel integral in rotation with the further tubular shaft 31 and, for ex-

ample, has the central hub keyed to said further shaft.

[0063] Suitably, means 50 are provided for mechanical transmission of the motion from the motorized output member 29 of the drive device 1 to the further member 40 integral in rotation with the further tubular shaft 31. Conveniently, the transmission means 50 are interposed and/or engage with the motorized output member 29 of the drive device 1 and with the further member 40 which is integral in rotation with the further tubular shaft 31. Preferably, these transmission means 50 can comprise for example at least one belt, smooth or toothed, a rope or a chain or even a transmission gear. More preferably, for example, the transmission means 50 comprises a toothed belt which is wound around a gear (which defines or forms part of the motorized output member 29) of the drive device 1 and is also wound around a toothed wheel (which defines or forms part of the further member 40) which is integral in rotation with the further tubular shaft 31.

[0064] Advantageously, therefore, the winding/unwinding rotation of the further tubular shaft 31 of the second roller group 30 is caused by the drive device 1 which is housed in an idle way (i.e. so as not to rotate) inside the tubular shaft 4 of the first roller group 3; in particular, considering that the tubular shaft 4 has a larger diameter - preferably much larger - than the further tubular shaft 31, it is thus possible to use for the movement of the latter a motor with a diameter of even about 35-50 mm and this makes it possible to have a much greater engine torque at the output. Conveniently, the actuator 18 of the device 1 can be defined by a motor with the same dimensions and/or performance as that of the drive unit 80.

[0065] Conveniently, in a possible embodiment, the motorized output member 29 can project, at least partially, within the lateral dimensions of the head 25. Preferably, the lateral dimensions (which is defined along the direction of exit from the casing 28) of the motorized output member 29 is completely contained within the lateral dimensions of the head 25. In this case, suitably, passages can be provided inside the head 25 for the transmission means 50.

[0066] Preferably, the drive device 1 can also comprise a command and control unit for the actuator 18 of the drive device 1. Preferably, the drive device 1 can comprise power supply means (for example a battery or cables for connection to an external electric source) of the actuator 18.

[0067] Conveniently, the drive device 1 can be mounted in the tubular shaft 4 at the same end or at the opposite end with respect to that in which the drive unit 80 is mounted which causes the rotation of the tubular shaft itself.

[0068] Conveniently, in a possible embodiment, the drive device 1 allows to bring outside the tubular shaft 4, the shaft inside which the device itself is housed, a further (second) drive which is independent of the (first) drive - obtained by the drive unit 80 - which causes the rotation of the tubular shaft 4 itself. In particular, the further drive caused by the drive device 1 is independent from the

functional point of view of the first drive caused by the drive unit 80 and, in particular, these two motorisations can be carried out and controlled both simultaneously and non-simultaneously (for example in sequence).

[0069] Conveniently, as mentioned, in another possible embodiment (cf. figs. 5, 6 and 9), the drive device 1 also comprises - in addition to the actuator 18 - the drive unit 80 configured to cause the rotation of the same tubular shaft 4 inside which the drive device 1 is inserted. In particular, in this case, the casing 28 of the drive device 1 is configured to house both the actuator 18 and the drive unit 80. Conveniently, in correspondence with a first end zone (base) of the casing 28 the motorized output member 29 emerges which is moved by the actuator 18 and which is intended to be engaged by the transmission means 50, while in correspondence with the other end zone (base) of the casing 28 the motorized output element 82 emerges which is moved by the drive unit 80 and which is associated with a driving adapter 8' to thus cause rotation one of the tubular shaft 4. Conveniently, in this case, the motor drive device 1 is installed in the tubular shaft 4 so that the first end region (base) of the casing 28, from which the motorized output member 29 emerges, is arranged at one end of the tubular shaft 4, thus allowing said motorized output member 29 to emerge from said end of the shaft 4, while the second end zone (base) of the casing 28, from which the motorized output element 82 is more inserted inside the shaft 4. Advantageously, in this embodiment (cf. fig. 5, 6 and 9), at the end of the shaft 4 which is opposite to that in which the drive device 1 is inserted, a plug 60 configured to be integral in rotation with the shaft 4 and provided of a protruding pin which is supported in an idle manner (i.e. so as to decouple the rotation) by a suitable element fixed to the external structure 7.

[0070] Suitably, the electronic components for the motorisation of the motorized output member 29 of the actuator 18 and, if provided, also of the motorized output element 82 of the drive unit 80 are also conveniently contained within the casing 28. Advantageously, at least one tubular electric actuator 18 is contained inside the casing 28 which is configured to rotate the output member 29 and the drive unit 80 could also be contained which is configured to rotate the output element 82.

[0071] Conveniently, the drive device 1 according to the invention comprises at least one power supply 20, at least one control unit 21 and at least one receiver 22 which is connected or incorporated in said control unit.

[0072] Advantageously, the power supply 20 for the actuator 18 and, if provided, for the drive unit 80 is housed inside the tubular casing 28.

[0073] Advantageously, at least one control unit (for example a processor) 21. Conveniently, the control unit 21 is configured to control the actuator 18 and to also control the drive unit 80 (if provided).

[0074] Conveniently, in a possible embodiment, the control unit 21 can be connected to an output interface (not shown) provided outside the tubular casing 28 and

in turn connected to other elements to be controlled, for example lighting elements or an audio amplifier, or other external elements in general. Conveniently, the connection between the control unit 21 (housed inside the casing 28, and therefore inside the tubular shaft 4) and the output interface (positioned outside the tubular shaft) is obtained by means of conductor cables for connection and transmission of electrical signals. Preferably, the control/communication drivers can be implemented in the control unit 21 with the output interface connected to the external elements.

[0075] Preferably, the receiver 22 is also provided inside the tubular casing 28 which is connected, via wireless and/or via wire, to the outside to thus receive command signals from the outside to control, on the basis of these, the actuator 18 and the drive unit 80 (if provided) of the device 1.

[0076] Advantageously, the receiver 22 is of the wireless type, preferably radio. Conveniently, through the receiver 22 the control unit 21 can receive from an external transmitter, and in particular from a remote control or even from a cellular phone (in particular of the smart-phone type) or from other conventional wireless devices in general, command signals of the actuator 18 and of the drive unit 80 (if provided) of the device 1. Conveniently, for this purpose, the receiver 22 is connected and/or incorporated in the electronic circuit of the control unit 21 to be operatively connected with the drivers control of the actuator 18 and of the drive unit 80 (if provided) of the device 1.

[0077] Advantageously, the receiver 22 can be connected via radio to other traditional sensors present in the environment.

[0078] The receiver 22 can be advantageously replaced by a transceiver, preferably a radio one, which in addition to sending corresponding command signals to the actuator 18 or to the drive unit 80 (if provided) of the device 1 can remotely communicate the status of the elements themselves and preferably also the operating parameters or the possible presence of anomalies or malfunctions. In particular, for this purpose, the transceiver, in addition to controlling the actuator 18 or the drive unit 80 (if provided) of the device 1 with its receiver side, can transmit signals on the state of the device components with the transmitter side. In essence, conveniently, in this way the user can remotely control, for example via a mobile phone (preferably via smartphone), the switching on, off and regulation of the actuator 18 or of the drive unit 80 (if provided) and can receive, always with the mobile phone (preferably a smartphone), information on the current status of this. Conveniently, the transceiver is connected and/or incorporated in the electronic circuit of the control unit 21 to be operatively connected with the control/communication drivers of the actuator 18 or of the drive unit 80 (if provided) of the device 1.

[0079] Advantageously, the power supply 20 housed in the tubular casing 28 can be powered from the outside, preferably it is powered directly through a cable connect-

ed to an external electric source (preferably to the mains). It is also provided that, alternatively, the power supply 20 housed in the tubular casing 28 can be powered by one or more batteries which are advantageously housed inside the tubular casing 28.

[0080] Advantageously, on the side wall of the tubular casing 28 it can a first door should be provided for accessing the tubular casing from the outside, for example to be able to access - if provided - the rechargeable battery. Advantageously, a second flap can also be provided in the tubular shaft 4 for accessing the first flap formed in the tubular casing 28. Conveniently, it is understood that the first flap of the tubular casing 28 and the second flap of the tubular shaft 4 are reciprocally look out.

[0081] Conveniently, in a possible embodiment (cf. Figs. 1, 2, 4a-4d and 8) in which the drive unit 80 is external to the drive device 1, the latter is electronically connected to the drive unit 80, for example by means of a cable which crosses the tubular shaft 4 internally or externally. Advantageously, in this case, a single control and/or power supply unit can be provided, for example mounted on the drive unit 80 for the control and command of both the drive device 1 and the drive unit itself.

[0082] Conveniently, in a further possible embodiment (such as for example the one illustrated in figures 5, 6 and 9) in which the drive device 1 also comprises the drive unit 80, a single control unit 21 can be provided for correspondingly control the actuator 18 and the drive unit 80, or two separate control units may be provided which are electronically connected to each other, to thus allow the exchange of signals and/or data.

[0083] The present invention also relates to a motorisation apparatus 200, to be mounted in correspondence with an installation 300 comprising a first roller group 3, preferably motorised, for example a roller shutter, and a second roller group 30, for example a dimming/filtering curtain or mosquito net. In particular, the drive apparatus 200 comprises:

- a drive device 1 which - and in particular its casing 28 - is configured to be housed inside the tubular shaft 4 of the first roller group 3,
- mechanical transmission means 50 for transferring the motion of the motorized output member 29 to a rotating member 40 which is configured to be integral in rotation with said further rotating shaft 31, to thus allow said drive device 1 which is mounted in said tubular shaft 4 to cause the movement in rotation of said further rotating shaft 31 around the axis X_2 .

[0084] In particular, the motorized output member 29 of the drive device 1 emerges from the tubular shaft 4 and is actuated in rotation by the actuator 18 of the device 1 and the motion of the motorized output member 29 is transferred, by means of transmission 50, to the further member 40 which is integral in rotation with the further tubular shaft 31, to thus cause the rotation of the latter around the axis X_2 .

[0085] In a first embodiment thereof (see fig. 8), the apparatus comprises a drive unit 80, to cause rotation of said tubular shaft 4 around the axis X_1 , which is external and structurally independent with respect to said device 1. Conveniently, the drive unit 80 is configured to be housed inside the tubular shaft 4 at one end of said shaft which is opposite to that into which the device 1 is intended to be inserted.

[0086] In a second embodiment thereof (see fig. 9), the apparatus comprises a device 1 - as described above - which, inside its casing 28, comprises a drive unit 80 which is configured to cause the movement in rotation of said tubular shaft 4 around the axis X_1 .

[0087] The present invention also relates to an installation 300 comprising a first roller group 3, preferably motorised, for example a roller shutter, and a second roller group 30, for example an awning dimming/filtering screen or fly screen, in which the motorisation of the movement of said two roller groups 3 and 30 is obtained by means of a device 1 or an apparatus 200 as described above.

[0088] Conveniently, in the installation 300 according to the invention, the drive device 1 can be mounted inside the tubular shaft 4 at the opposite end to that where the drive unit 80 is mounted (cf. Fig. 1, 2 and 8), or - in the version of the device 1 which also contains the drive unit 80 for the shaft 4 - it is housed inside the same/single end of the tubular shaft (cf. 5, 6 and 9).

[0089] Conveniently, in the installation according to the invention, the motorized output member 29 of the drive device 1 is configured so that its axis of rotation X_3 is parallel with respect to the axis of rotation X_1 of the tubular shaft 4 at the inside which the casing 28 of said device 1 is inserted and also with respect to the axis of rotation X_2 of said additional further tubular shaft 31 to be moved by means of said device 1.

[0090] From what has been said it is clear that the device and/or the motorization according to the invention is quite advantageous in that it allows the independent motorization of two winding/unwinding shafts of corresponding roll-up elements, while optimizing the installation space. Furthermore, with respect to the state of the art, the problems deriving from the dimensional limits, and therefore performance limits, of the motors that can be used are also resolved since, in the solution according to the invention, both motors are housed inside the same winding shaft/ winding that has a larger diameter.

[0091] The solution according to the present invention has been described here in particular with reference to an installation in which the first roller group is of the rolling shutter type and the second roller group is of the dimming/filtering curtain or mosquito net type, however it is understood that it can be used in any other application in which the movement of at least two winding/unwinding shafts for corresponding roll-up elements is envisaged.

[0092] The present invention has been illustrated and described in some of its preferred embodiments, but it is understood that executive variations can be made to

them in practice without however departing from the scope of protection of the present patent for industrial invention.

Claims

1. Device (1), to be mounted in correspondence with an installation (300) with a first roller group (3) comprising a tubular winding/unwinding shaft (4) for a roll-up element (5) and with at least one second roller group (30) comprising a further tubular winding/unwinding shaft (30) for a further roll-up element (32), and to be used preferably to drive the movement of said further tubular winding/unwinding shaft (31) of said further roll-up element (32), said drive device (1) being **characterized in that** it comprises:

- a casing (28), preferably tubular in shape, which is configured to be removably inserted inside said tubular shaft (4) of said first roller group (3),
- a head (25) which is associated with said casing (28) so as to protrude, at least in part, from one end of the tubular shaft (4) in which the casing (28) is intended to be removably inserted, said head (25) being configured for and/or being intended to be fixed to an external support structure (7),
- an actuator (18) which is housed inside said casing (28),
- means (24) mounted on said head (25) and/or on said casing (28) and configured to idle support the tubular shaft (4),
- a motorized output member (29) projecting from said casing (28) and which is actuated in rotation by said actuator (18), said motorized output member (29) also being configured to project from one end of the tubular shaft (4) in which the casing (28) is intended to be removably inserted and being also configured to be engaged by motion transmission means (50).

2. Device according to claim 1, **characterized in that** said motorized output member (29) comprises a gear or pulley.

3. Device according to one or more of the preceding claims, **characterized in that** said motorized output member (29) comes out so as to be positioned, at least in part, within the lateral dimensions of said head (25).

4. Device according to one or more of the preceding claims, **characterized in that** it also comprises a drive unit (80) configured to cause rotation in both directions of the tubular shaft (4) inside which said device (1) is intended to be inserted, said drive unit

(80) being housed inside said casing (28) and being provided with a motorized output element (82) which protrudes from said casing (28) to thus cause rotation, preferably by a towing adapter (8'), of the tubular shaft (4).

5. Device according to the preceding claim, **characterized in that** said motorized output member (29), which is actuated in rotation by said actuator (18), emerges from a first base of the casing (28), while said motorized output element (82), which is actuated in rotation by the drive unit (80), emerges from the other opposite base of the casing (28).

6. Device according to one or more of the preceding claims, **characterized in that** it comprises inside the casing (28):

- at least one power supply (20) for said actuator (18) and, if provided, for said drive unit (80),
- at least one control unit (21) for said actuator (18) and, if provided, for said drive unit (80),
- at least one receiver (22), which is connected or incorporated in said at least one control unit, to receive external command signals for said actuator (18) and, if provided, for said drive unit (80).

7. Apparatus (200) for driving a first roller group (3) comprising a tubular shaft (4) for winding/unwinding a roll-up element (5), for example a rolling shutter, and at least one second roller group (30) comprising a further tubular shaft (31) for winding/unwinding a further windable element (32), for example a black-out/filtering curtain and/or a mosquito net, said apparatus being **characterized in that** it comprises:

- a drive device (1) according to one or more of the preceding claims, wherein the casing (28) of said device (1) is configured to be removably inserted in an idle way inside said tubular shaft (4) and in where the output member (29) of said device (1) is intended to come out from one end of said tubular shaft (4),
- mechanical transmission means (50) for transferring the motion of the output member (29) to a further member (40) which is configured to be integral in rotation with said further rotating shaft (31), to thus allow said drive device (1) which is mounted in said tubular shaft (4) to cause the movement in rotation of said further rotating shaft (31) around its longitudinal development axis X_2 .

8. Apparatus according to the preceding claim, **characterized in that** it also comprises a drive unit (80) to cause rotation of the tubular shaft (4) around its longitudinal development axis X_1 , called drive unit

(80) being structurally external and independent with respect to said device (1) and being configured to be housed inside the tubular shaft (4).

9. Apparatus according to the preceding claim, **characterized in that** said further member (40) comprises a pulley or a toothed wheel which is configured to be integrated in or mounted on said further tubular shaft (31) so as to be integral in rotation with this.

10. Installation (300) for a window, door, glazing or gate in general, said installation comprising:

- a first roller group (3) with a tubular shaft (4) for winding/unwinding a roll-up element (5), for example a roller shutter, and
- at least a second roller group (30) comprising a further tubular shaft (31) for winding/unwinding a further roll-up element (32), for example a blackout/filtering curtain and/or a fly screen,

said installation being **characterized in that** it comprises a drive apparatus (200) according to one or more of claims 7 to 9.

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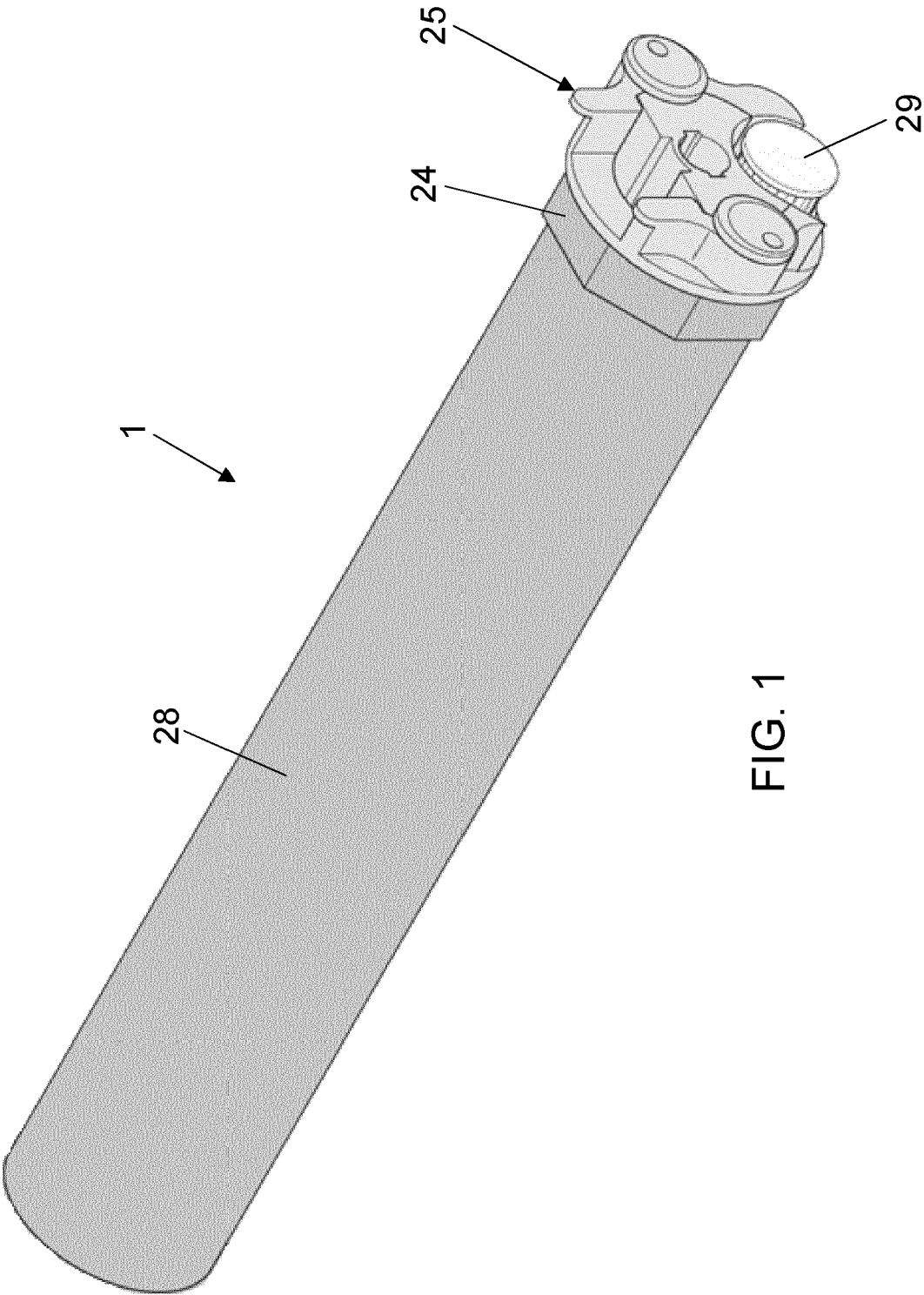
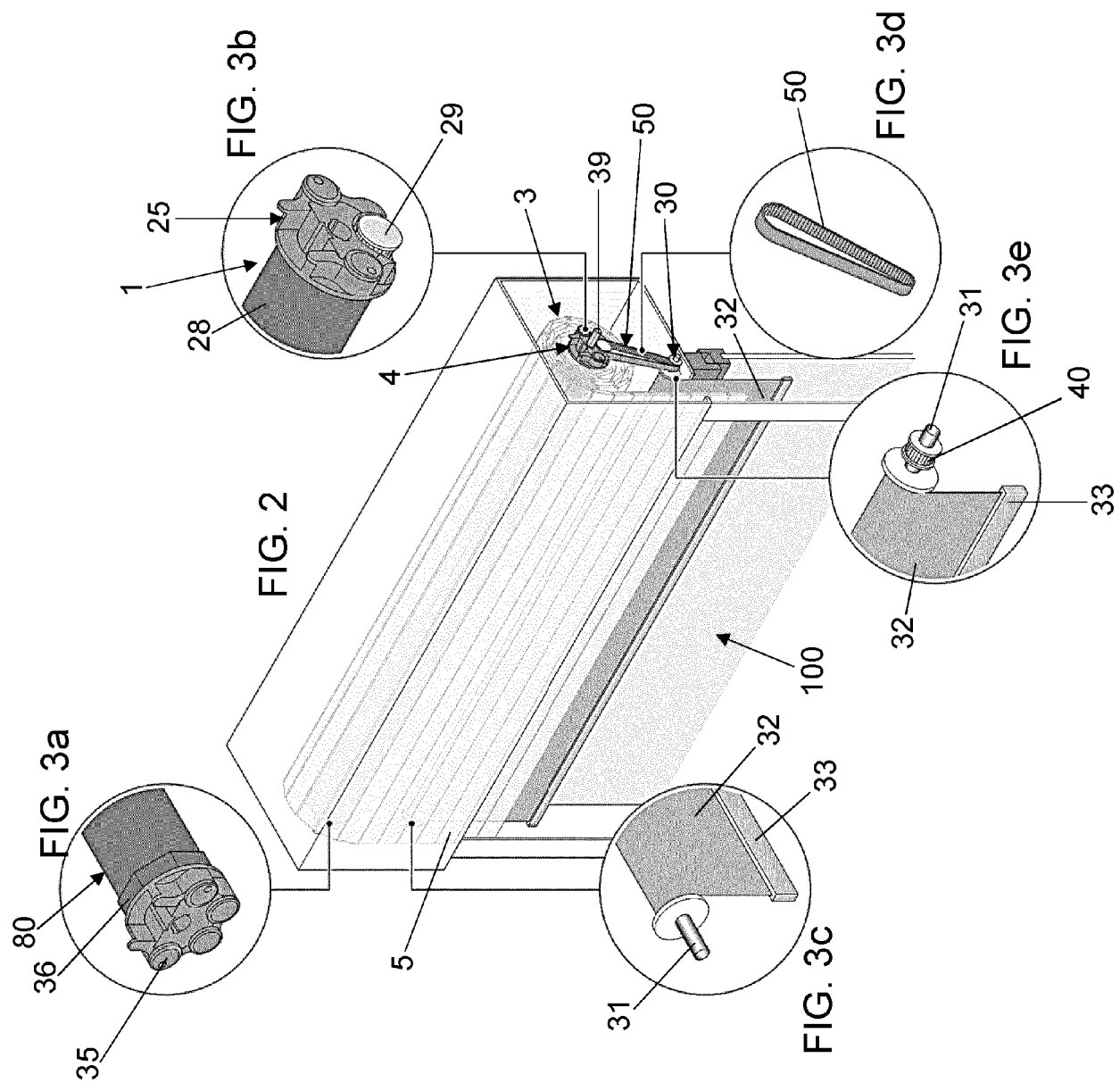


FIG. 1



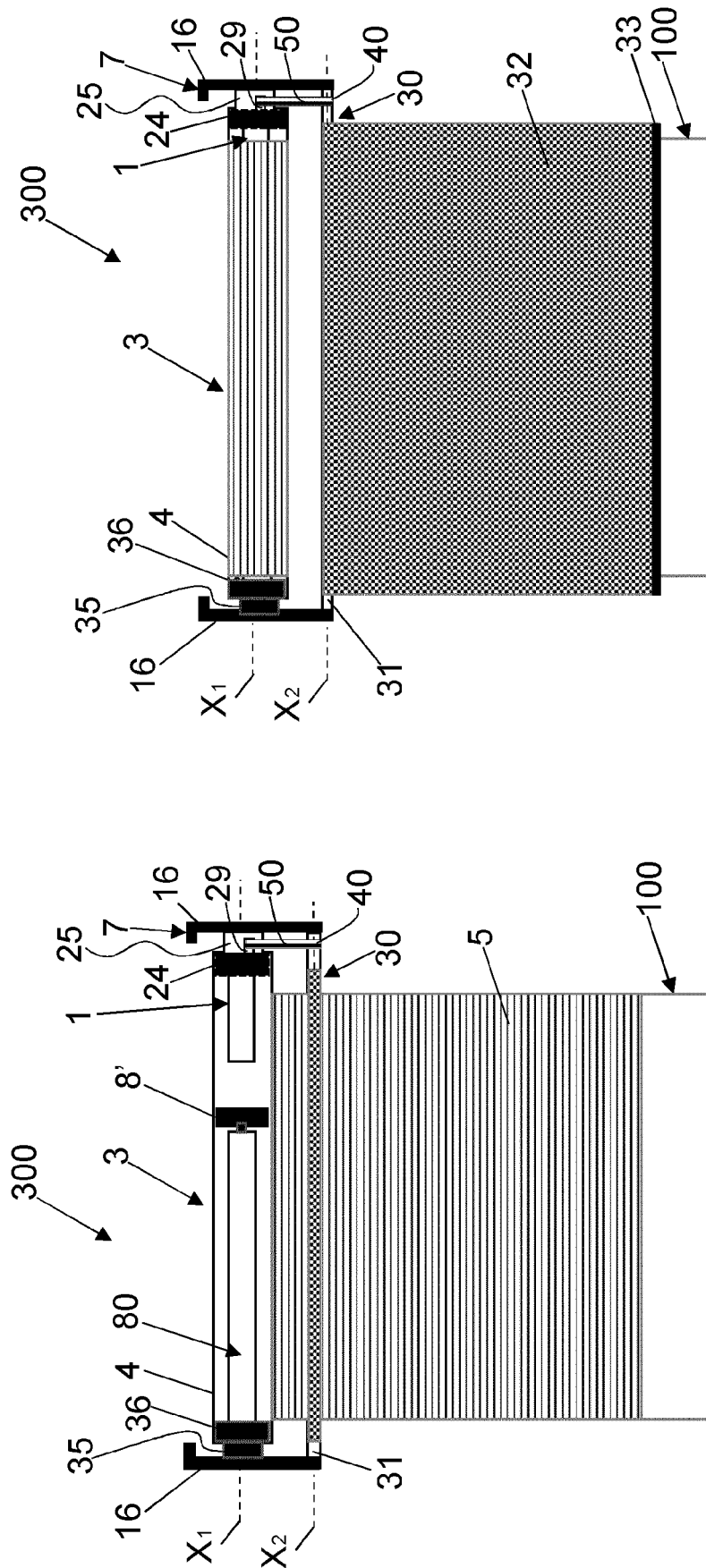
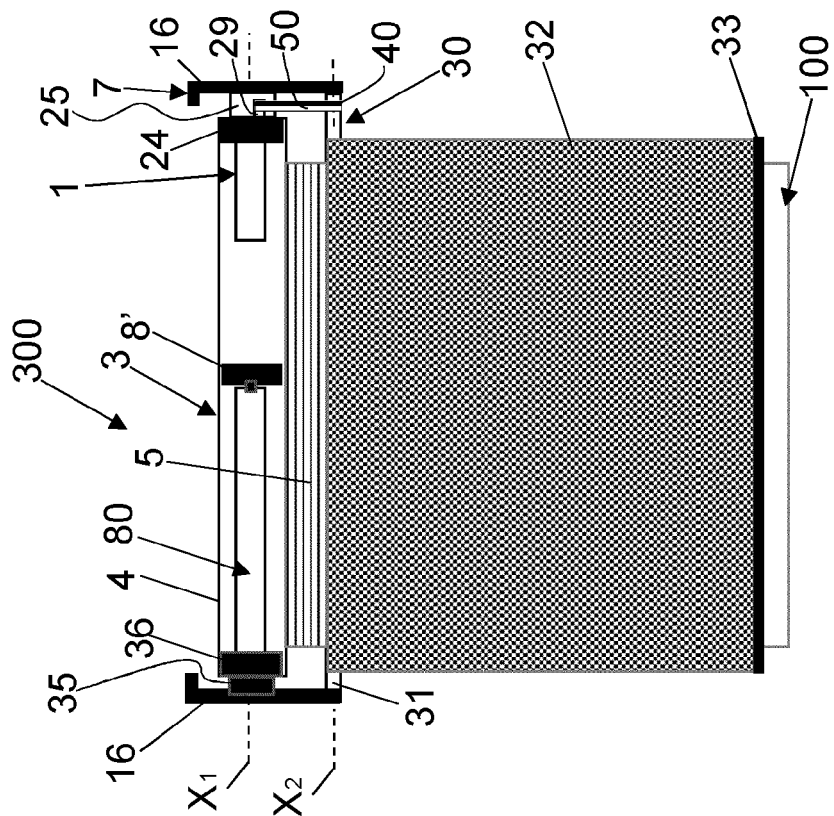
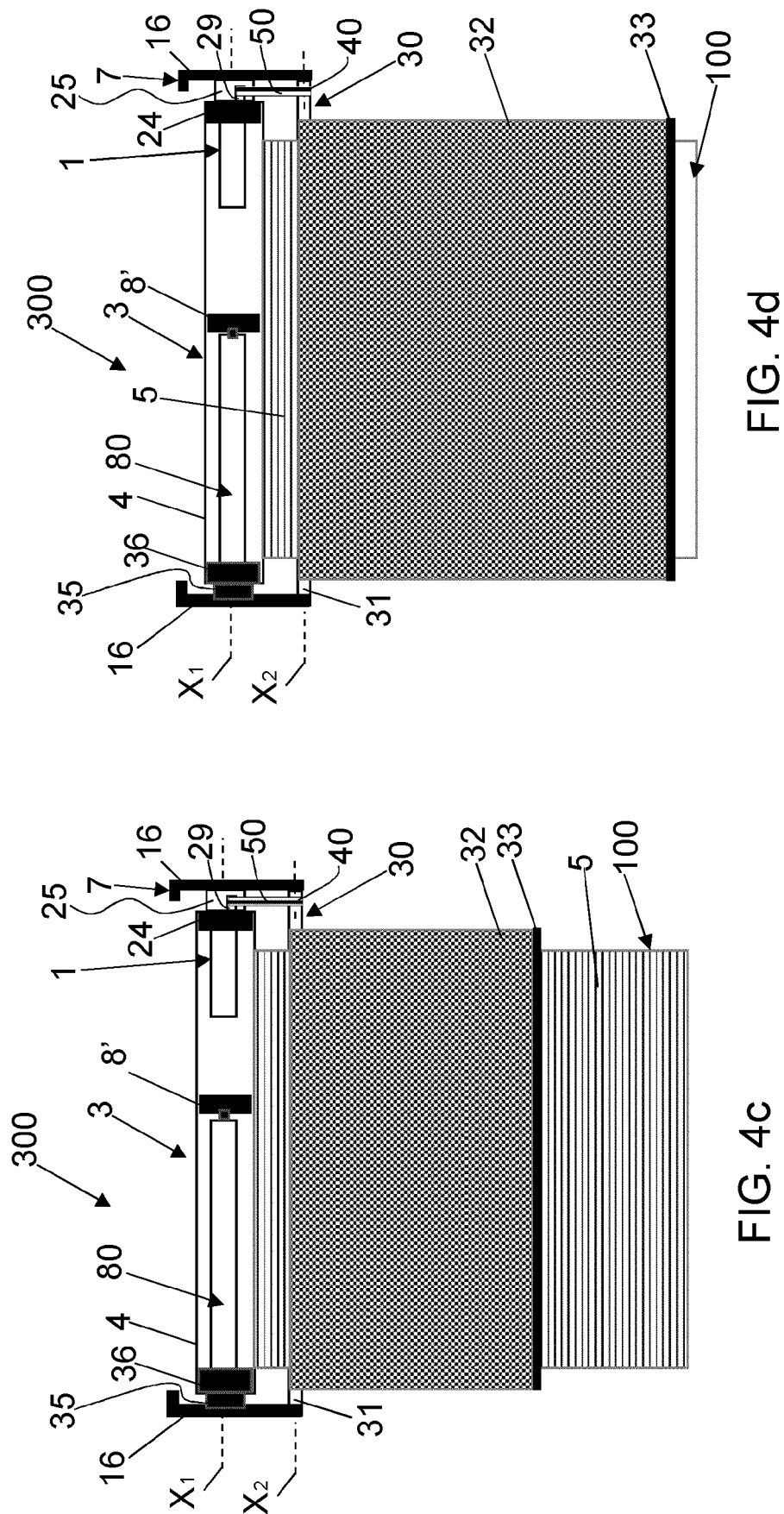


FIG. 4b

FIG. 4a



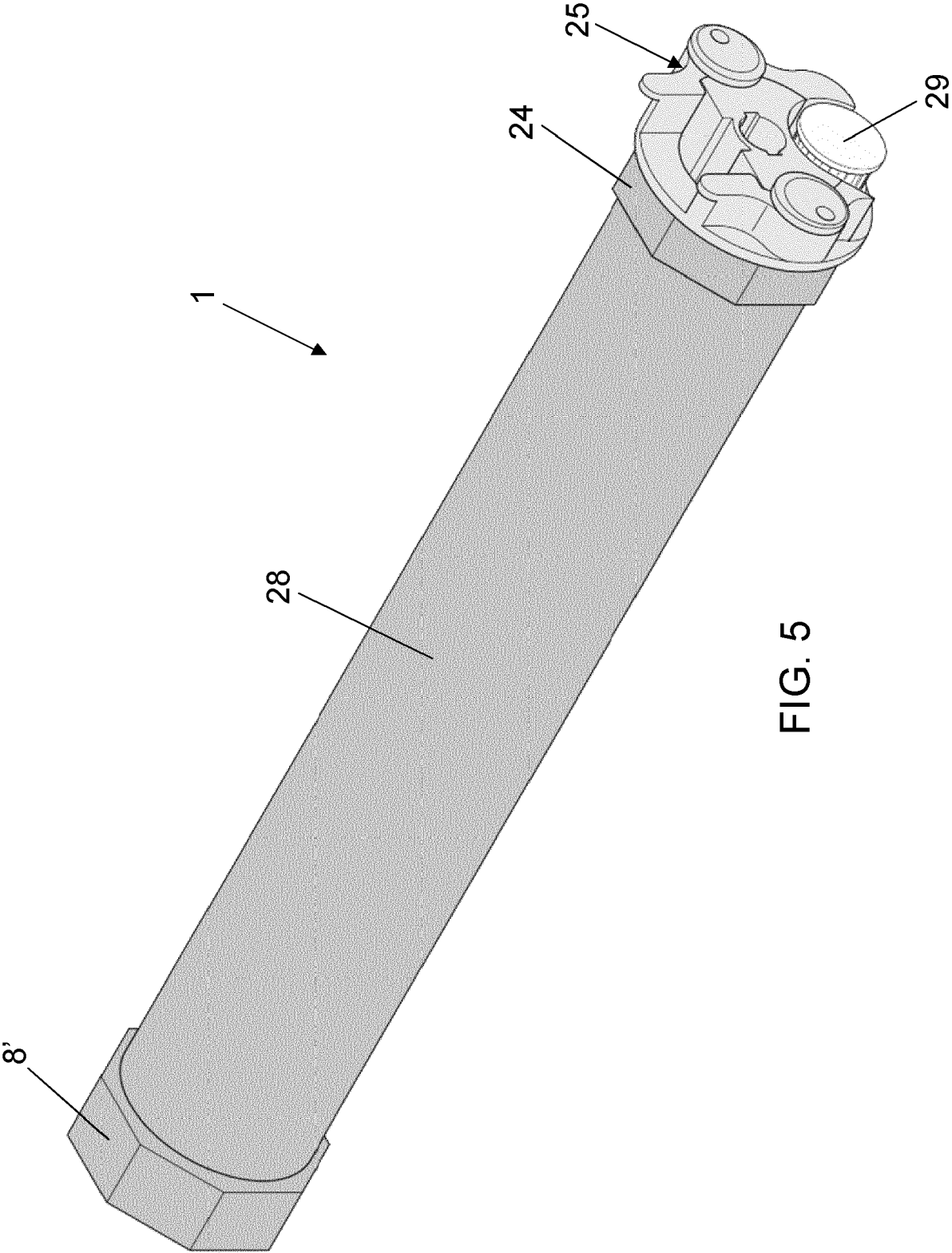
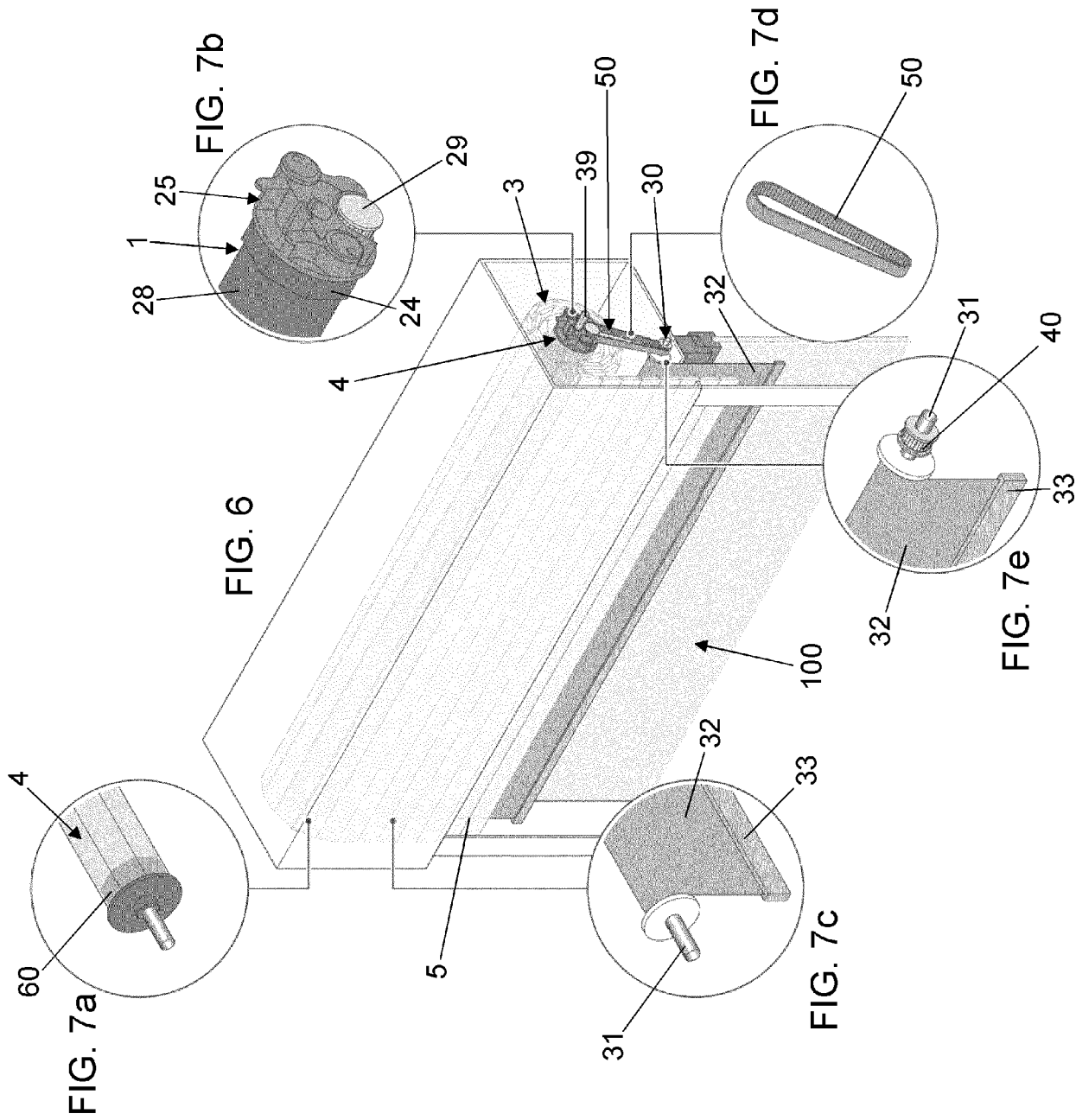
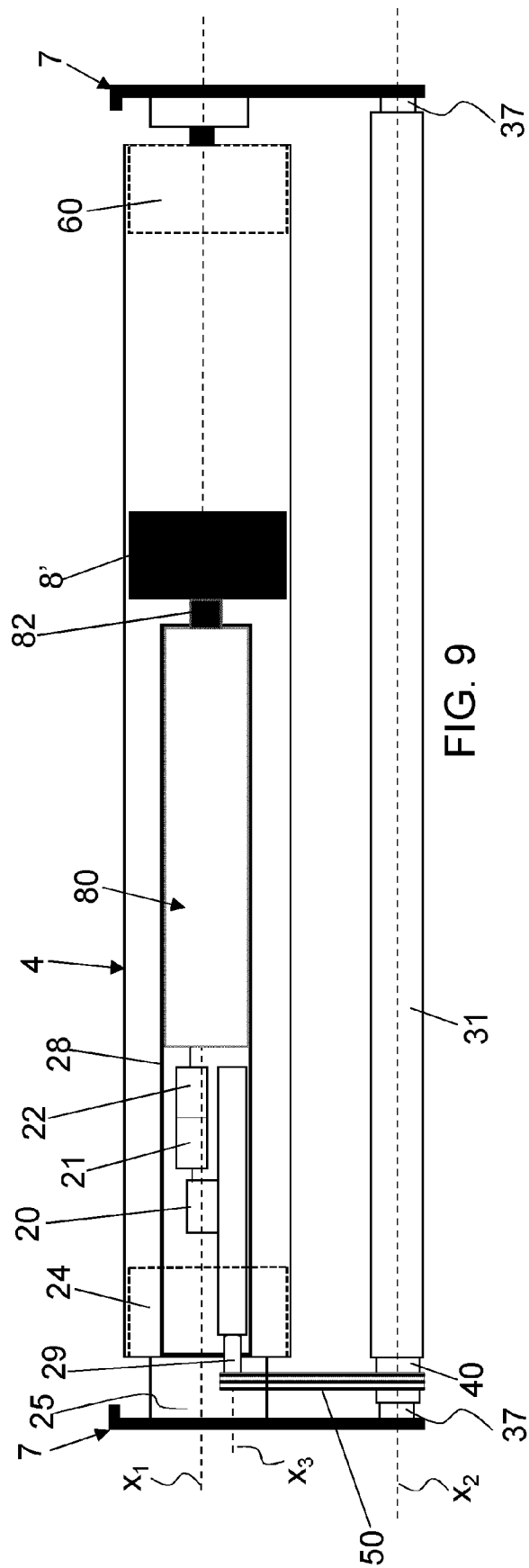
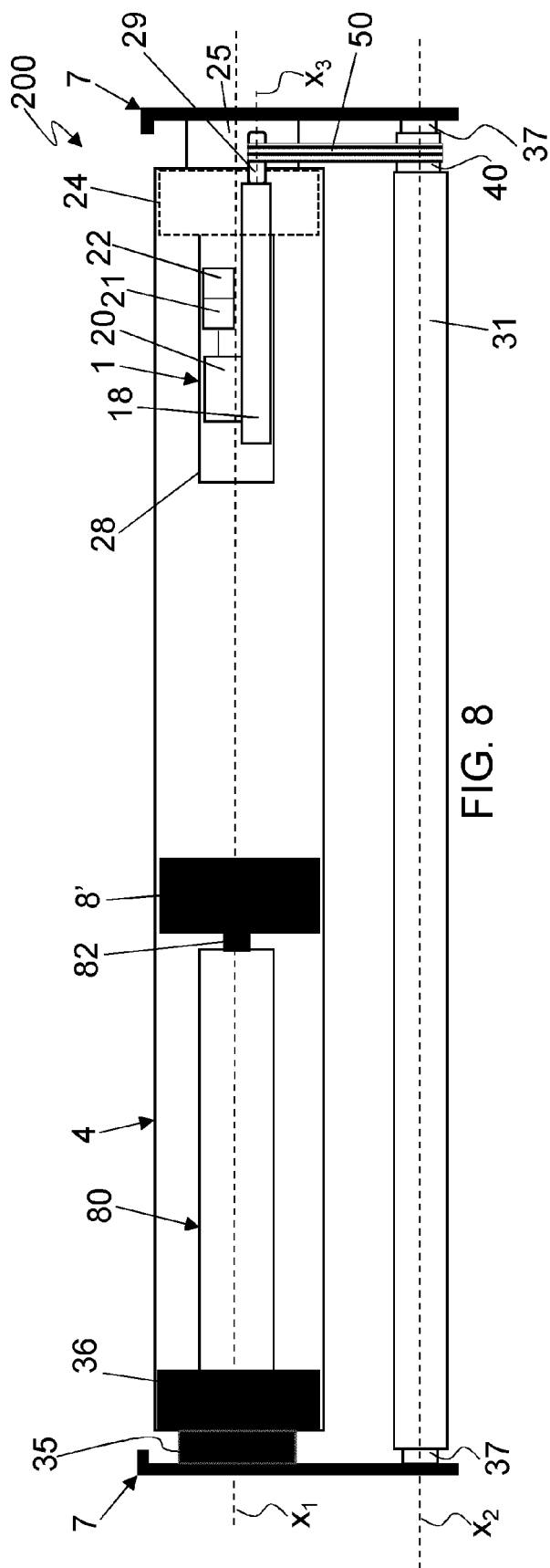


FIG. 5







EUROPEAN SEARCH REPORT

Application Number

EP 22 20 7595

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	FR 2 936 007 A1 (FRANCIAFLEX [FR]) 19 March 2010 (2010-03-19) * page 6, line 3 - page 11, line 25; claims 1-10; figures 1,2 * -----	1-3, 6-10	INV. E06B9/54 E06B9/70 E06B9/72
X	EP 3 569 809 A1 (ZURFLUEH FELLER [FR]) 20 November 2019 (2019-11-20) * paragraphs [0012] - [0029], [0047] - [0056]; claim 1; figures 1-5,10 * -----	1-3, 6, 7, 10	
			TECHNICAL FIELDS SEARCHED (IPC)
			E06B
The present search report has been drawn up for all claims			

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Place of search Munich	Date of completion of the search 15 March 2023	Examiner Kofoed, Peter
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15-03-2023

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