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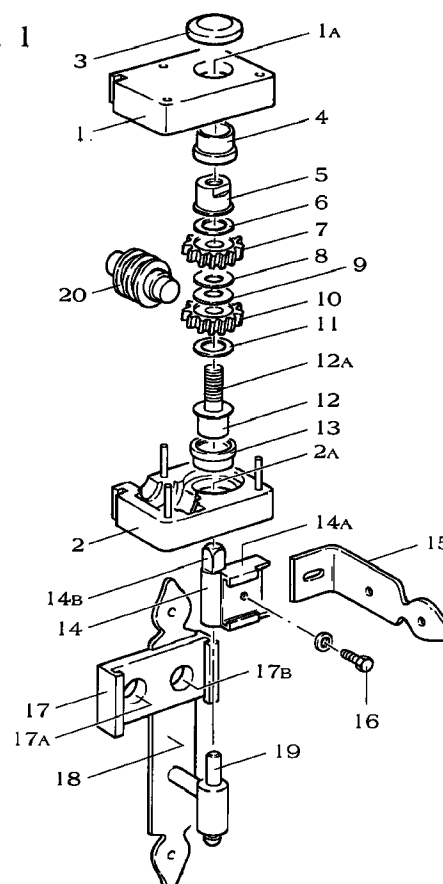
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(54) **Device for moving and retaining shutters from the inside of the building**

(57) A device for moving and retaining shutters from the inside of the building, comprising a reduction unit with a worm screw gear system (20) actuated by an actuation shaft and stably engaged in a ring gear (7,10) located on the pivoting axis of the leaf-like part, comprising friction means (6,11) and elastic means (8,9) for transmitting the actuation motion from the gear system to the leaf-like part; the means, although using a nonreversible gear system and in order to prevent a sudden force affecting the leaf-like part in contrast with the reduction unit from damaging the reduction unit or the means for fixing the device to the leaf-like part, allow the connection of the gear system to the leaf-like part to be moved to occur due to the friction applied through the friction means (6,11) and elastic means (8,9), adequately compressed.

FIG. 1



EP 0 955 434 A2

Description

[0001] The present invention relates to a device for moving and retaining external leaf-like door and window frames from the inside of a building.

[0002] The movement of external leaf-like door and window frames, better known as slatted or solid shutters, has practical limitations mainly due to the fact that differently from the movement of Venetian or roll-up blinds it is possible only after opening the internal glazed door and window frames and is impossible in the presence of gates arranged between the internal door and window frames and the external ones.

[0003] Moreover, in order to ensure the open position of leaf-like door and window frames also in the presence of wind, suitable retainers are arranged on the outside of the wall; their operation is awkward for anyone and is certainly dangerous for elderly people and children, since they have to lean out of the window to engage or release the door and window frame.

[0004] The aim of the present invention is therefore to obviate the above-mentioned limitations and drawbacks, allowing to move the external door and window frames from the inside of the building, also with the glazing panels closed or in the presence of gates, further avoiding the use of conventional external retainers since the device can keep the door and window frames in their fully open configuration and at any other intermediate angle desired in each instance.

[0005] Another object of the present invention is to allow easy application of the new actuation device also to door and window frames that have already been installed, since it is only necessary to form two holes in the masonry: one hole for the anchor for fixing the supporting element and another through hole for the insertion of the actuation shaft which, from the inside of the building and with conventional manual means or by means of an electric reduction unit, allows to actuate the device applied to one of the hinge pivots of the leaf-like part to be moved outside.

[0006] Such actuation shaft is substantially horizontal and perpendicular to the wall that it crosses and is inserted in a worm screw which is stably engaged in a ring gear located on the vertical pivoting axis of the leaf-like part to be moved in one direction or the other by virtue of its rotation.

[0007] It should be specified that other devices equipped with a ring gear and a worm screw are already commercially available for functions which are similar to those of the present invention; however, in addition to being particularly onerous to manufacture and to install, they are scarcely reliable, since the ring gear is stably and rigidly coupled to the leaf-like part to be moved. Accordingly, since this is a notoriously nonreversible gear system, a sudden or excessive force affecting the leaf-like part, due to wind or other reasons, can damage the leaf-like part or the actuation device.

[0008] The aim, the objects and others which will

become apparent hereinafter are achieved by a device according to the present invention for moving and retaining external leaf-like door and window frames from the inside of the building, said device comprising a reduction unit with a worm screw gear system actuated by an actuation shaft and stably engaged in a ring gear located on the pivoting axis of the leaf-like part, characterized in that it further comprises friction means and elastic means for transmitting the actuation motion from the gear system to the leaf-like part, said means, although using a nonreversible gear system and in order to prevent a sudden force affecting the door or window frame in contrast with the reduction unit from damaging said reduction unit or the means for fixing the device to the leaf-like part, allow the connection of the gear system to the leaf-like part to be moved to occur due to the friction applied through said friction means and elastic means, adequately compressed.

[0009] Further characteristics and advantages of the present invention will become apparent hereinafter from the detailed description of a preferred embodiment of the new device, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is an exploded view of the device together with the strap with hinge pivot on which it is to be fixed;

Figure 2 is a perspective view of the device already in position and installed and before fixing the door or window frame;

Figure 3 is a cutout view of the condition shown in Figure 2;

Figures 4 and 5 are rear perspective views of the device and of the adapter support for fixing on top of a strap as in Figure 2 or directly to the wall;

Figures 6 and 7 are sectional views, taken along the planes XX and YY, of the device complete with its fixing adapter support.

[0010] The accompanying drawings clearly show first of all that the reduction unit, of the ring gear and worm screw type, is enclosed in a prism-shaped box, whose two halves (1 and 2) are joined along the horizontal plane that passes through the axis of the worm screw 20 and are perforated, in 1A and 2A respectively, along the vertical axis of the ring gear, which in this embodiment is formed by two parts (7 and 10) in order to interpose the Belleville spring washers 8 and 9 between them. While the worm screw 20 is stably and rigidly coupled to the actuation shaft to be inserted in the square hole 20A which can be accessed from the rear side of the box 1-2 (Figures 4 and 6), the two ring gears 7 and 10 are stably meshed in said screw 20 but do not have a fixed connection to the leaf-like part to be moved; this is done to prevent a sudden force affecting said part from damaging the mechanism or the means for fixing the device to the leaf-like part.

[0011] In this regard, the exploded view of Figure 1

and the sectional view of Figure 7 show that the movement of the ring gears 7 and 10 reaches the leaf-like part across a transmission pivot 12, on whose threaded stem 12A the bush 5 is screwed, retaining between the friction pads 6 and 11 the ring gears 7 and 10, separated by the Belleville spring washers 8 and 9 which are interposed between them.

[0012] The adequate tightening of the assembly that comprises the two ring gears with the springs and the friction pads, which is also facilitated by the flat grip regions of the bush 5 and by the square hole 12B provided in the transmission pivot 12, allows to obtain the friction required for the ring gears 7 and 10 to actuate, in their motion, the pivot 12 and the corresponding bush 5 without however preventing them from coping with any sudden movement or even with the stopping of the leaf-like part to which the pivot 12 is rigidly coupled, since by having said square hole 12B at the lower hole 2A of the box it allows the insertion coupling of the square protrusion 14B that protrudes vertically from the pivoting eye 14 which is fitted on the hinge pivot 19 and from which the bracket 14A protrudes laterally; the adjustable fixing of the L-shaped strap 15 is adjustably fixed to said bracket 14A by means of the screw 16 and said strap is in turn fixed to the leaf-like part by means of screws.

[0013] The transmission pivot 12 and the corresponding tightening bush 5 are supported in the box 1-2 by the bushings 4 and 13 which are inserted and retained by an abutment collar respectively in the holes 1A and 2A of the box 1-2, which is completed in an upward region by the application of a cover 3.

[0014] As regards the ring gears 7 and 10, each one of said gears, in order to contain the dimensions of the device, has on both faces a recessed circular seat in which it accommodates a friction pad on one side and one of the two Belleville spring washers on the other side.

[0015] The box 1-2 that encloses the described reduction unit allows, in a rear region, the insertion coupling of the actuation shaft in the square hole 20A of the worm screw 20. At the two sides of said box 1-2, proximate to the rear face, vertical slots are provided for the interlock insertion of the corresponding raised portions of the element 17, which is termed adapter support hereinafter, for wall mounting.

[0016] Said adapter support, provided with a hole 17A for the passage of the actuation shaft of the worm screw 20 and with a hole 17B for the wall mounting anchor, has a collar which circumscribes said hole 17B and protrudes from a recess suitable to accommodate the strap 18 which is provided with the bracket for supporting the hinge pivot 19.

[0017] Accordingly, during installation and regardless of whether the bracket of the hinge pivot protrudes from a strap or directly from the wall, the adapter support 17, like a template, is placed on the wall in order to easily locate, with respect to the hinge pivot involved, the exact points where the hole for the fixing anchor and the hole

for the actuation shaft are to be provided.

[0018] Another important characteristic of the invention is the fact that the box 1-2, inserted in the adapter support 17 until it rests on the hinge pivot 19 by means of the pivoting eye 14, is rigidly coupled in this configuration as a consequence of the engagement of the actuation shaft in the worm screw of the reduction unit. Accordingly, since the box 1-2 is in such a position as to conceal the wall mounting anchor of the support 17, and since the actuation shaft can be extracted only from the inside of the building, the device, once installed, does not allow tampering or vandalistic removal.

[0019] The method of operation of the device can be deduced easily from the above description.

[0020] It should also be noted that the accompanying drawings do not illustrate the means for driving the actuation shaft, the one inserted in the worm screw 12 of the reduction unit, since such means are known and are chosen in each instance according to the vertical elevation of the device and to the preferred type of actuation.

[0021] For example, when applying the device to the lower hinge pivot of the leaf-like part of a window or to the intermediate hinge pivot of the leaf-like part of a French window, the actuation shaft might be driven by means of a simple crank. Otherwise, when applying the device to the upper hinge pivot of the leaf-like part of a window or of a French window, the actuation shaft might be driven by means of a crank applied to an articulated rod or also by means of rotating elements of the belt or chain type.

[0022] In any case, especially by virtue of the lack of a fixed connection between the device and the leaf-like part to be moved, the actuation shaft might be driven by an electric gearmotor located inside the building and controlled by means of a button or a remote control.

[0023] Finally, it is evident that the present invention, without altering the general characteristics that have been illustrated and described, can be susceptible of modifications and variations which are in any case within the present patent scope, such as for example the use of a single ring gear and a different arrangement or configuration of the friction elements and of the elastic elements to be compressed in order to adjust the friction required to move the transmission pivot rigidly connected to the leaf-like part.

[0024] The materials employed, as well as the dimensions, may be any according to requirements.

[0025] The disclosures in Italian Patent Application No. FO98A000014 from which this application claims priority are incorporated herein by reference.

[0026] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A device for moving and retaining external leaf-like door and window frames from the inside of the building, comprising a reduction unit with a worm screw gear system (20) actuated by an actuation shaft and stably engaged in a ring gear (7, 10) located on the pivoting axis of the leaf-like part, characterized in that it further comprises friction means (6, 11) and elastic means (8, 9) for transmitting the actuation motion from the gear system to the leaf-like part, said means, although using a non-reversible gear system and in order to prevent a sudden force affecting the leaf-like part in contrast with the reduction unit from damaging said reduction unit or the means for fixing the device to the leaf-like part, allow the connection of the gear system to the leaf-like part to be moved to occur due to the friction applied through said friction means and elastic means, adequately compressed.
2. The device according to claim 1, characterized in that the reduction unit, constituted by a ring gear (7, 10) and a worm screw (20), is enclosed in a prism-shaped box whose two halves (1, 2) are joined along the horizontal plane that passes through the axis of said worm screw (20) and are provided with respective holes (1A and 2A) along the vertical axis of said ring gear provided in two parts (7, 10), both of which are stably meshed in the worm screw (20) and actuate the leaf-like part through a transmission pivot (12), on whose threaded stem (12A) a bush (5) is screwed in order to secure, between said friction means constituted by friction pads (6, 11), the ring gears (7, 10) between which said elastic means are interposed, said elastic means being constituted by Belleville spring washers (8, 9) which, adequately compressed by the tightening action, ensure the friction required for the rings (7, 10) to entrain in their movement said pivot (12) and the corresponding bush (5) without however preventing them from following any sudden movement or even the stopping of the leaf-like part to which the pivot (12) is stably and rigidly coupled.
3. The device according to the preceding claims, characterized in that a square hole (12B) is provided in the transmission pivot (12), in the end that lies furthest from the threaded stem (12A), and protrudes from the lower hole (2A) of the box (1, 2), said square hole being provided for the insertion coupling of a corresponding square raised portion (14B) which protrudes vertically from the pivoting eye (14) which is fitted on the hinge pivot (19) and from which there protrudes laterally a bracket (14A) for the adjustable fixing of the L-shaped strap (15) which is in turn fixed to the leaf-like part by means of screws.
4. The device according to the preceding claims, characterized in that said bush (5) has flat grip regions which, together with the square hole (12B) of the transmission pivot, allow to tighten the interposed elements also after the closure of the box (1, 2), into the holes (1A, 2A) of which the bush (5) and the pivot (12) protrude and are supported thereat by bushings (4, 13) which are inserted from the inside of the box and are retained by suitable abutment collars.
5. The device according to the preceding claims, characterized in that in order to limit the vertical dimensions of the box (1, 2) that encloses the mechanism, each one of said two ring gears (7, 10) has, on both faces, a circular recessed seat in which a respective friction pad (6, 11) is to be accommodated at one end and one of said two mutually opposite Belleville spring washers (8, 9) is to be accommodated at the other end.
6. The device according to the preceding claims, characterized in that the box (1, 2) that encloses the mechanism is also shaped so that it can be engaged, by simple vertical insertion, in a support (17) which is already fixed to the wall and accordingly has two holes, one for the fixing anchor and the other one for the actuation shaft that protrudes from the wall in order to be inserted in the square hole (20A) of the worm screw (20) which protrudes from the rear side of the box (1, 2).
7. The device according to the preceding claims, characterized in that the support (17) can be fixed to the wall either directly or by surmounting a possibly provided strap (18), since it can accommodate said strap in a suitably provided recess from which a collar protrudes until it is flush with the wall resting surface, said collar surrounding the hole (17B) for the anchor and being meant to be inserted in the corresponding hole of said strap.
8. The device according to the preceding claims, characterized in that the box (1, 2), whose interlock insertion in the support (17) allows to conceal the wall fixing anchor thereof, is rigidly coupled when installed as a consequence of the insertion of the actuation shaft in the worm screw (20), also in order to protect the device from any tampering or vandalistic removal.

FIG. 1

