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(54) **Actuator for hinged door panels**

(57) A mechanical actuator for hinged door panels, with a motor (2) housed in a box (26) to be placed underground, characterised in that the motor is mounted on a bracket (28) which supports the door panel (36) and is hinged about a vertical pivot (32) fixed to the box, the axis of said vertical pivot (32) being also the pivot axis of the door panel (36), the shaft (4) of said motor being provided with a pinion (20) which engages in a curved rack (22) with its centre of curvature lying on the axis of said vertical pivot.

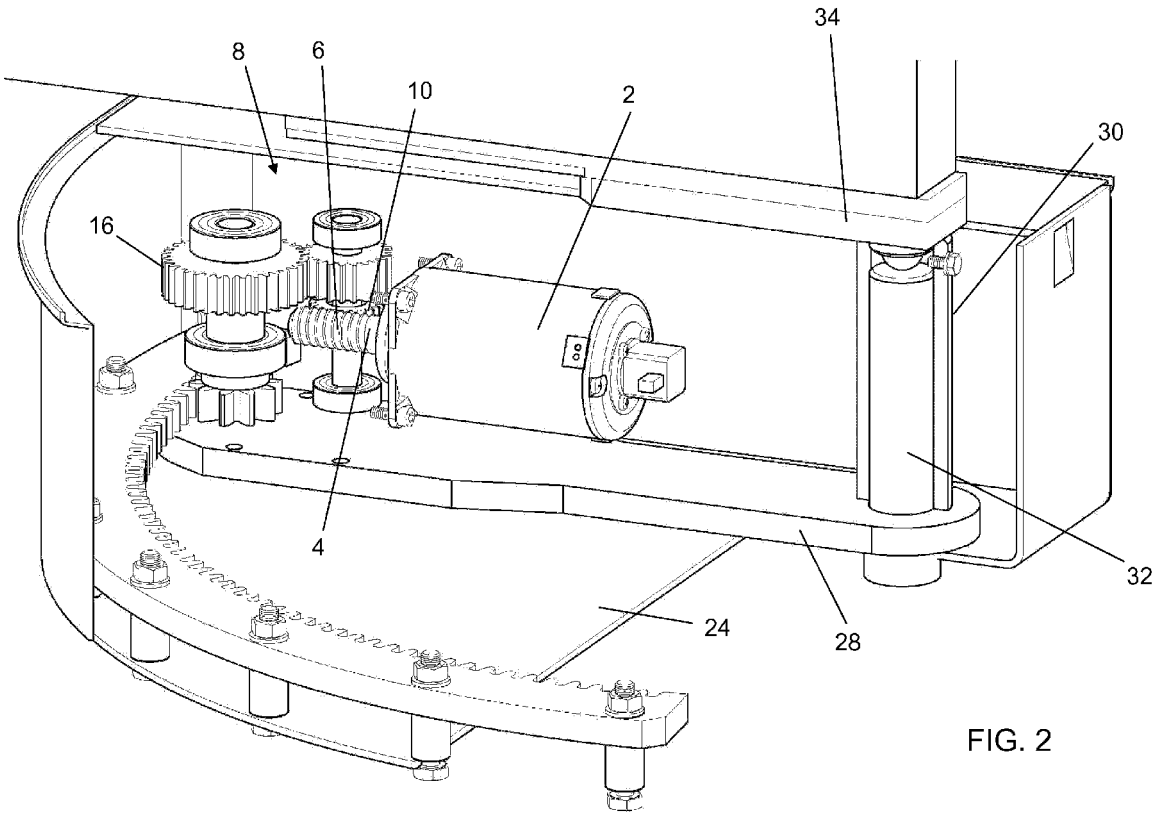

FIG. 2

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Description

[0001] The present invention relates to an actuator for hinged door panels.

[0002] Actuators for hinged door panels are known, housed in an underground box and comprising an electric motor of vertical axis, the shaft of which carries a first pinion keyed onto the end thereof.

[0003] The first pinion is connected by a chain to a second pinion keyed onto a shaft to which a support bracket for the door panel is rigidly connected.

[0004] In other cases the first pinion is connected to the second pinion via a third motion reduction pinion.

[0005] In both cases these actuators present the drawback of a considerable force required for opening and closing the door panel due to the small dimensions of the door panel rotation arm.

[0006] The object of the invention is to eliminate this drawback by providing an actuator which enables the door panel to be opened and closed by a small force.

[0007] This object is attained according to the invention by a mechanical actuator for hinged door panels as described in claim 1.

[0008] The present invention is further clarified hereinafter with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of an actuator according to the invention together with a door panel,
Figure 2 shows it in enlarged perspective view, and
Figure 3 is an enlarged detailed view of the kinematic linkage.

[0009] As can be seen from the figures, the actuator according to the invention comprises an electric motor of horizontal axis, the output shaft 4 of which carries applied thereto a worm 6 coupled to a reduction gear unit indicated overall by 8.

[0010] The reduction gear unit 8 consists of a first gearwheel 10 coupled to the worm 6 and rigidly connected to a shaft 12, with the top of which a second gearwheel 14 is rigidly connected having a diameter greater than the first gearwheel 10 and engaging a third gearwheel 16 of diameter greater than the other two.

[0011] The third gearwheel is rigidly connected to the upper end of a shaft 18, to the lower end of which a pinion 20 is secured, and engages a 90°-curved rack 22 rigid with the base 24 of an underground metal box 26 of triangular plan.

[0012] The motor 2 is mounted on a horizontal bracket 28 rigidly secured to a vertical sleeve 30 into which a vertical pivot 32 rigid with the base 24 of the box is inserted. The pivot 32 corresponds to the centre of curvature of the rack 22.

[0013] A further bracket 34 for supporting the door panel 36 is applied to the top of the sleeve.

[0014] The actuator operation is traditional in that rotating the shaft 4 of the electric motor 2 in one or other direction results in rotation of the pinion 20 via the kinematic linkage formed by the worm 6 and gearwheels 10, 14, 16, leading to rotary movement of the door panel by virtue of the engagement between the pinion 20 and the rack 24.

Claims

1. A mechanical actuator for hinged door panels, with a motor (2) housed in a box (26) to be placed underground, **characterised in that** the motor is mounted on a bracket (28) which supports the door panel (36) and is hinged about a vertical pivot (32) fixed to the box, the axis of said vertical pivot (32) being also the pivot axis of the door panel (36), the shaft (4) of said motor being provided with a pinion (20) which engages in a curved rack (22) with its centre of curvature lying on the axis of said vertical pivot.

2. An actuator as claimed in claim 1, **characterised in that** the shaft of said motor is provided with a worm (6) engagable with the pinion (20).

3. An actuator as claimed in claim 1, **characterised in that** the motor is mounted horizontally on the bracket (28).

4. An actuator as claimed in claim 2, **characterised by** comprising a reduction gear unit (8) interposed between the worm (6) and the rack (22).

5. An actuator as claimed in claim 1, **characterised in that** the bracket is rigid with a sleeve (30) in which the vertical pivot (32) engages.

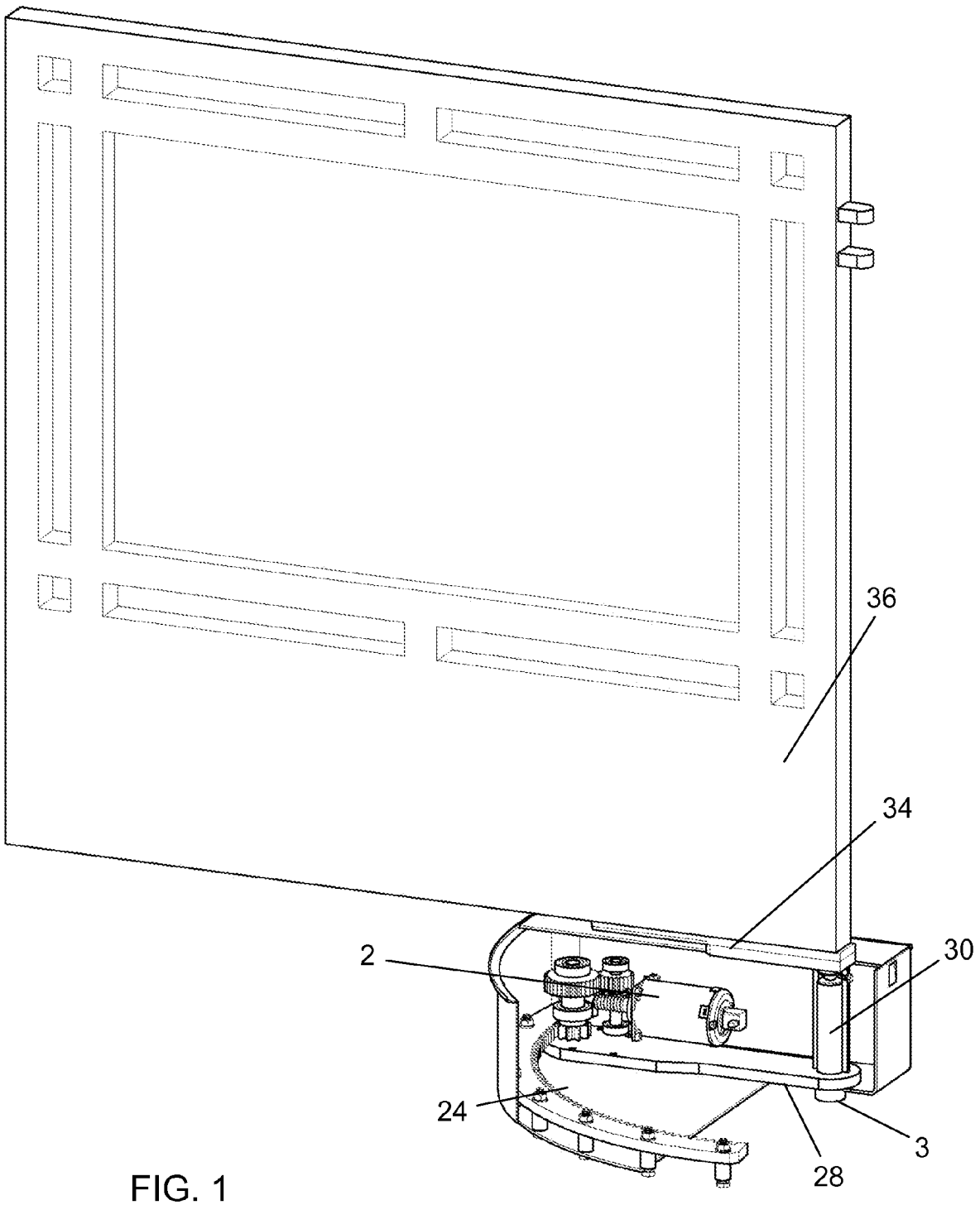

FIG. 1

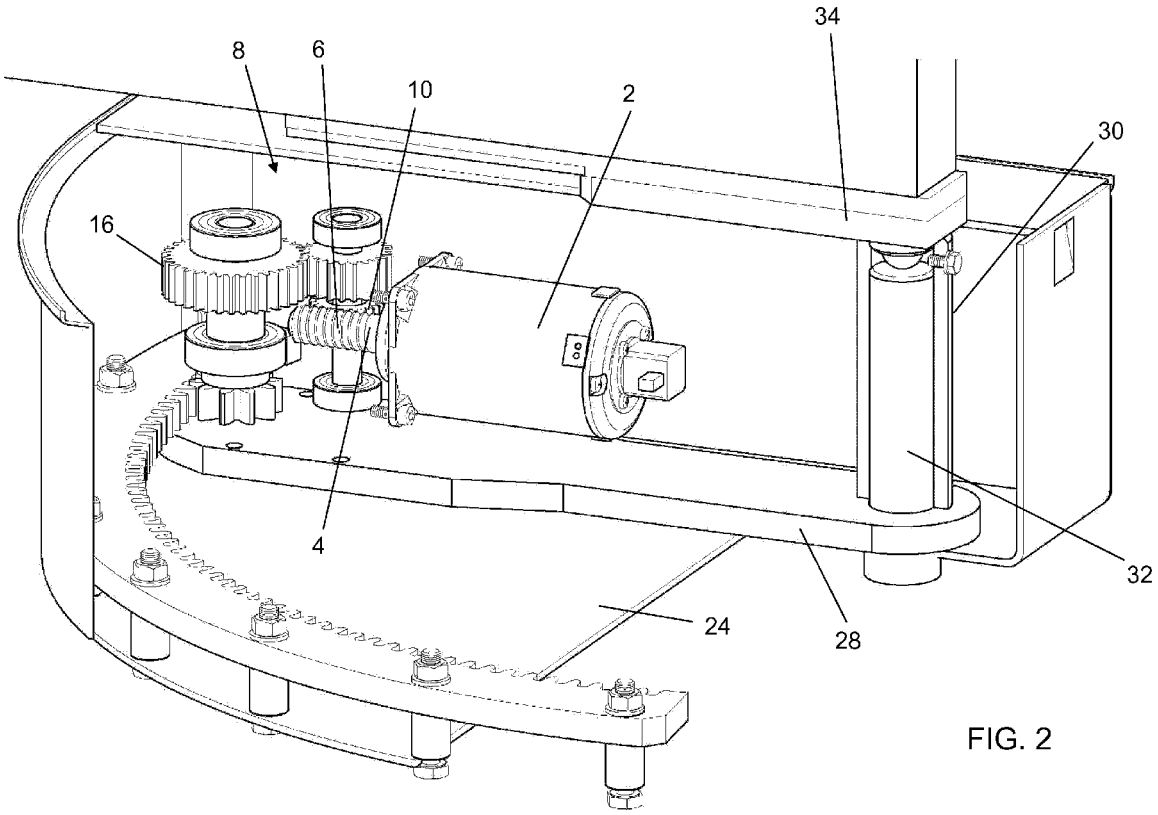

FIG. 2

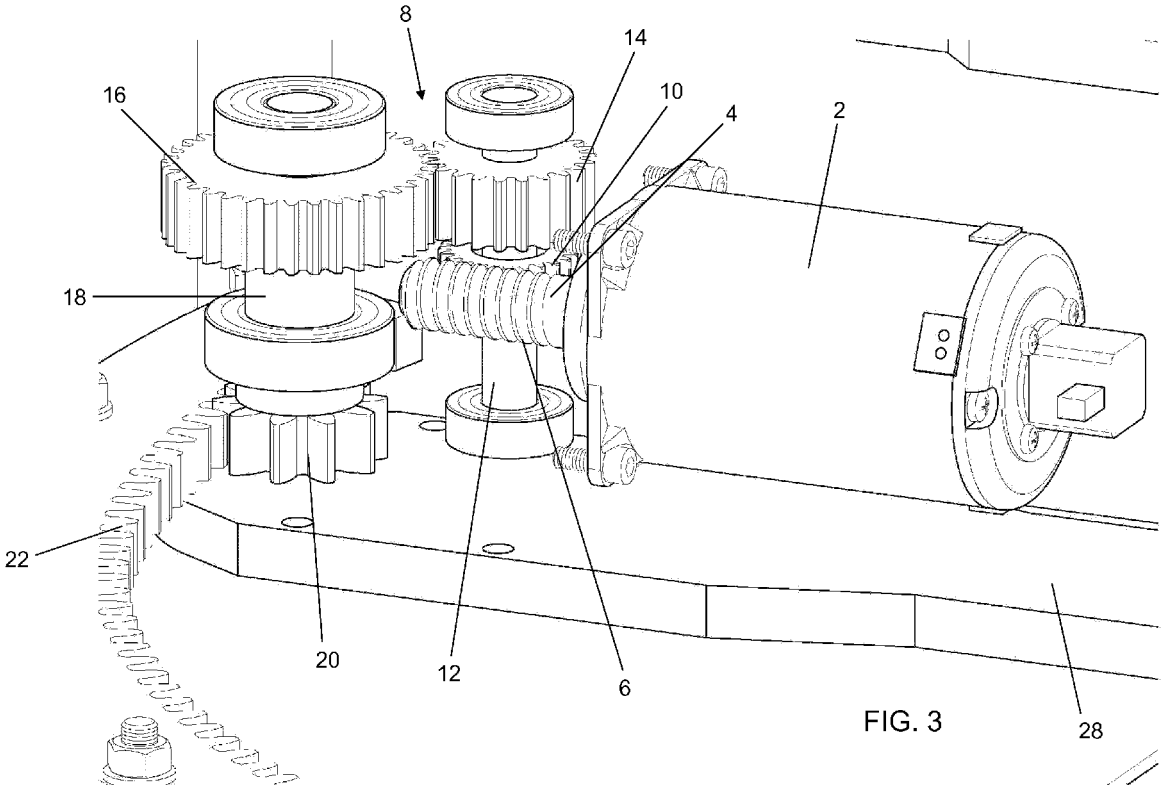

FIG. 3

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EUROPEAN SEARCH REPORT

Application Number
EP 11 16 8146

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	GB 2 264 534 A (AUTOGATES SDN BHD [MY]) 1 September 1993 (1993-09-01) * page 5, lines 15-18 * * page 9, lines 5-11 * * claim 9 * * figures 1-3 *	1-5	INV. E05F15/12
A	DE 32 44 795 A1 (PERTL PETER) 7 June 1984 (1984-06-07) * page 7, lines 16-20 * * page 12, lines 11-23 * * page 13, lines 2-5 * * page 15, lines 17-28 * * figures 1,6,7 *	1-5	
A	WO 02/36906 A2 (CHURTON MAN LTD [NZ]; LANGE STEPHEN MARK [NZ]) 10 May 2002 (2002-05-10) * page 6, lines 3-15,22-26 * * page 9, lines 11-13 * * figure 2 *	1-5	TECHNICAL FIELDS SEARCHED (IPC)
A	US 2003/038500 A1 (AUBRY MICHAEL EUGENE [US] ET AL) 27 February 2003 (2003-02-27) * paragraphs [0015], [0017], [0018], [0023] * * figures 3,7 *	1-5	E05F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	11 July 2011	Wagner, Andrea

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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11-07-2011

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82