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(54) **ROLLER DEVICE FOR POOL COVERS**

(57) Roller device for pool covers, comprising:
- a rotary shaft (2), with a free end (4) and a motor end (5);
- two support feet (3), for supporting the ends (4, 5); and
- a rotary shaft drive mechanism (2).

Each of the support feet (3) comprises:
- an internal bracket (7), which in turn comprises:
- a central circular housing (12) for coupling the corresponding end (4, 5); and
- a bearing system (13), located around the central hous-

ing (12) and integrated in the bracket (7), for directly supporting and guiding the rotation of the rotary shaft (2); and

- an external casing (9) for covering the bracket (7),
The ends (4, 5) of the rotary shaft (2) and the drive mechanism are completely housed inside their corresponding support foot (3) and protected from the elements.

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Description

Object of the invention

[0001] The present invention falls within the technical field of covers for swimming pools, more specifically, that of covers made of a flexible material, and in particular it relates to a roller device for pool covers.

[0002] Said roller device is conceived for flexible covers of the raised type and comprises a tubular rotary shaft on which the flexible cover covering the swimming pool is rolled and unrolled; two support feet for supporting the respective ends of the rotary shaft; and a drive mechanism for rotary displacement of the shaft in two directions, corresponding to the rolling and unrolling of the cover on the shaft and, therefore, the folding and unfolding of the cover over the pool basin.

Background of the invention

[0003] Within the swimming pool sector, flexible covers are widely known and used to temporarily cover the basin of a swimming pool when it is not in use. Said covers perform, on the one hand, preserving functions of the optimal conditions of the water contained in the swimming pool, as well as avoiding additional costs due to evaporation losses and reducing heat losses. On the other hand, they minimize the premature evaporation of chemicals in water treatment and prevent accidents due to drowning caused by falls into the water.

[0004] Said flexible covers typically comprise a winding roller on which the cover is collected, in turn made up of a plurality of slats attached together, said slats being made of a material with floating capacity. Within the sector of these flexible covers, a first distinction should be made between submerged and raised ones. The former are specially designed for newly built pools, and are characterized in that both the roller and the cover are housed inside the pool, being completely hidden from view when not in use.

[0005] Raised flexible covers are a simpler and cheaper solution, easy to install, repair and start up in both new and existing pools, since the roller is located outside the pool, located above the level of the sheet of water, and anchored on the surface adjacent to a perimeter edge of the same, raised on support feet to which it is attached at their respective ends.

[0006] Various patent documents relating to raised flexible covers and their driving elements are known in the current state of the art. Thus, for example, the French patent with publication number FR3061502 refers to a cover for artificial swimming pools that comprises a canvas and a reel that allows the canvas to be unrolled and rolled, the canvas further comprising a float edge along its free end, opposite the end by which it is connected to the reel. The edge of the float holds the free end of the cover to the surface of the water in the pool, and the cover has side edges provided with reinforcing elements that

facilitate the unrolling of the canvas.

[0007] International PCT application with publication number WO2014000111 describes an apparatus for covering a swimming pool that includes a frame, a cover assembly supported at least partially by the frame, and a drive mechanism. The cover assembly includes a generally flat main portion and at least one edge portion adjoining a side edge of the main portion. The drive mechanism engages the edge portion and moves the cover assembly relative to the frame to advance or retract the cover assembly. The drive mechanism can include first coupling elements, and the edge portion can include second coupling elements which interact with the first coupling elements.

[0008] Another example can be found in WO2010080827, which describes a pool reel assembly that includes a roller that is vertically adjustable between the pool and the diving board. This adjustability allows the same reel to be used with different pools that have a variety of widths and distances between the top of the pool and the bottom of the diving board. The reel assembly comprises a motor base, an idler base, a roller bar, a motor bracket, a motor, an idler bracket, a power supply, a switch, a remote control, and a remote-control timer.

[0009] Finally, EP2157261 describes a swimming pool coating device having a folding or rolling mechanism, that is to say, a rolling tube, which extends transversely to the unfolding direction of a flexible and roll-up cover. A pulley type lifting unit comprises an articulated arm to maintain the mechanism in an angular position with respect to its longitudinal axis during displacement of the mechanism between a retracted position and a raised position above a swimming pool. A housing is adjacent to the pool in the retracted position of the mechanism, and the lid is placed over the pool to unfold the lid in the raised position.

[0010] All the above-described devices display a series of common problems and disadvantages, such as, for example, oxidation in the exposed metal parts such as the winding drum or the drive mechanism, misalignments and noises produced by friction elements or even the high volume the total assembly occupies, especially due to the dimensions of the support feet.

Description of the invention

[0011] The object of the present invention consists of a roller device for swimming pool covers intended to be installed next to a perimeter edge of a swimming pool to provide it with a raised flexible cover which temporarily covers the pool basin, so that the device allows the automatic unfolding and folding of said cover.

[0012] For this purpose, the device is basically made up of the following elements:

- a rotary shaft, of tubular geometry, on which the flexible cover covering the pool is rolled up and unrolled;

- two support feet for supporting the respective ends of the rotary shaft: and
- a drive mechanism for rotary displacement of the shaft in two directions, corresponding to the rolling and unrolling of the cover on the shaft and, therefore, the folding and unfolding of the cover on the pool basin.

[0013] The ends of the rotary shaft, preferably made of aluminum, as well as one end of the drive mechanism, are embedded inside each of the two feet, not being exposed to the elements. This arrangement lengthens the useful life and improves the final aesthetic appearance.

[0014] The drive mechanism preferably consists of an electric motor housed inside the shaft, in the vicinity of one of its ends.

[0015] Meanwhile, each of the support feet comprises an internal support and an external covering and protection casing. They are preferably made of injected plastic and have smaller dimensions than usual, thus achieving more compact roller devices.

[0016] Each foot is configured for supporting the weight of the cover and the torque of the rolling and unrolling motor. Its design also allows adding additional functions such as a box for an electronic board for remote control of the device, or a connection box with conduits for power supply cables of the drive motor.

[0017] The external casing can be made in various geometries and colors, facilitating the integration of the device in the environment in which it is installed.

[0018] On the other hand, the internal support of each support foot incorporates a bearing system, preferably rollers, for direct support of the rotary shaft. This arrangement improves the mechanical efficiency and production and maintenance costs, as well as it avoids the production of squeaks and the need for additional elements such as shafts and bushings, thus reducing the dimensions of the device. During normal operation of the device, the bearing system supports the weight of the aluminum cover and shaft.

[0019] The device thus described represents a simple and economical solution, with improved mechanical efficiency, which makes it possible to have a roller device for swimming pool covers of reduced dimensions with respect to those currently existing and which avoids the main problems related to them.

Description of the drawings

[0020] To complement the present description and in order to help to obtain a better understanding of the characteristics of the present invention, according to a preferred example of practical embodiment thereof, a set of drawings is attached as an integral part of said description. where, for illustrative and non-limiting purposes, the following has been depicted:

Figure 1.- Shows a perspective view of the roller de-

vice for pool covers installed next to a pool basin.

Figure 2.- Shows an exploded view of the roller device, in which its main constituent elements can be seen.

Figure 3.- Shows a detailed view of the device's bearing system.

Figure 4.- Shows a view of a cross section made at one end of the device.

Figure 5.- Shows a view of a cross section made at the end of the device opposite to that of figure 4.

Preferred embodiment of the invention

[0021] A detailed explanation of a preferred embodiment of the object of the present invention is provided below, with the aid of the aforementioned figures.

[0022] The roller device for pool covers is intended to be installed next to a perimeter edge of a pool, as illustrated in figure 1, to provide it with a flexible and raised cover (1) for temporary covering the pool basin, so that the device allows the unfolding and folding of said cover (1).

[0023] For this, the device comprises a rotary shaft (2) on which the cover (1) is rolled and unrolled, two support feet (3) for supporting and maintaining the rotary shaft (2) above the ground, and a drive mechanism rotary shaft (2), as seen in the exploded view of figure 2.

[0024] The rotary shaft (2) is made up of a hollow tubular body, which in this preferred embodiment is made of aluminum and has an external diameter of 146 mm. Said rotary shaft (2) has a first end or free end (4) and a second end or motor end (5), which are inserted in the respective support feet (3).

[0025] The drive mechanism consists of a motor (6), which in this case is electric, linked to the rotary shaft (2) and which it rotatably displaces. In this preferred embodiment, the motor (6) is inserted inside the rotary shaft (2), specifically at its motor end (5), and comprises a rotation inverter, so that in a direction of rotation of the motor (6), the rotary shaft (2) produces the unwinding of the cover (1) and its unfolding on the pool basin, and in the opposite direction of rotation of said motor (6), the cover (1) is rolled up on the rotary shaft (2) and it is retracted from the pool basin.

[0026] The drive mechanism also comprises a limit switch mechanism (17) of the motor (6).

[0027] Each of the support feet (3) comprises an internal bracket (7), intended to be anchored to the perimeter edge of the pool by means of joining elements (8), and an external casing (9) to cover the bracket (7). The casing (9) in turn comprises a rear lid (10), destined to be facing towards the rotary shaft (2), and a front lid (11), destined to be facing outwards.

[0028] In the preferred embodiment described herein,

the bracket (7) is made of injected polyamide plastic reinforced with fiberglass for mechanical reinforcement, although in other alternative embodiments it can be made of aluminum. The rear lid (10) and the front lid (11) herein are made of injected ASA plastic in order to improve resistance to the elements. In some preferred embodiments of the roller device, a trim (20) made of lacquered aluminum sheet completes the casing (9) between both lids (10) and (11). This trim (20) allows customizing the color of the support foot (3).

[0029] The front lid (11) can display various customizable geometries in order to facilitate the aesthetic harmonization of the device in the environment in which it is installed.

[0030] The bracket (7), shown in more detail in figure 3, comprises a central housing (12) for coupling one of the ends (4, 5) of the rotary shaft (2), and therefore has a circular geometry. A bearing system (13) is located around the central housing (12), integrated in the body of the bracket (7), for directly supporting and guiding of the rotation of the rotary shaft (2).

[0031] The support foot (3) also comprises a mounting plate (14) which constitutes a reinforcement that helps to mechanically transmit and support the torque of the motor (6), as seen in figure 5.

[0032] The decoupling of this mounting plate (14) from the support foot (3) allows a manual operation of the rotary shaft (2) in case of failure of the motor (6), as well as allows the removal of said motor (6) for repair or replacement without the need to disassemble the brackets (7) and the rotary shaft (2), which in this case remains supported on the bearing system (13). The mounting plate (14) is located on the support foot (3) corresponding to the motor end (5).

[0033] The support foot (3) also includes a connection box (15), integrated in the bracket (7), which allows the insertion of remote-control elements (21) of the device, such as an electronic board, and electrical connections for powering motor (6).

[0034] The rear lid (10) of the casing (9) comprises a central hole (16) that can be confronted with the central housing (12) of the bracket (7) to allow the passage of the corresponding end (4, 5) of the rotary shaft (2). The front lid (11) is completely closed, in order to prevent tampering. The front lid (11) of the support foot corresponding to the motor end (5) incorporates an opening and closing device which allows access to the drive mechanism.

[0035] Figure 4 shows how the ends (4, 5) of the rotary shaft (2), in this case the motor end (5), are completely housed inside their corresponding support foot (3), thus avoiding being exposed to the elements as in current roller devices.

[0036] The limit switch mechanism (17) of the motor (6) is also housed inside the support foot (3), protected for a longer useful life. The adjustment of the limit switch mechanism (17) is still accessible by removing the front lid (11).

[0037] In this preferred embodiment, the rotary shaft (2) has a slot or keyway type longitudinal housing (18), for fixing the cover (1) to said rotary shaft (2). A wedge (19) is inserted at the ends of the longitudinal housing (18) for ensuring the cylindrical continuity of the rotary shaft (2) with the bearing system (13).

[0038] As can be seen in the detail of figure 2, the fixing of the cover (1) to the rotary shaft (2) is carried out by means of couplings consisting of screws (22) passing through platens (23) that can be inserted into the longitudinal housing (18).

Claims

1. Roller device for pool covers, to be installed next to a perimeter edge of a pool for automatic unfolding and folding of a flexible and raised cover (1) for temporary covering of the pool basin, comprising:

- a tubular rotary shaft (2), on which the cover (1) is rolled and unrolled, having a free end (4) and a motor end (5);
- two support feet (3), for supporting the ends (4, 5) of the rotary shaft (2) and maintaining it raised above the ground; and
- a rotary shaft (2) drive mechanism, for rotary displacement of the rotary shaft (2) in two corresponding directions with the rolling and unrolling of the cover (1) on the rotary shaft (2);

the device being **characterized in that** each of the support feet (3) comprises:

- an internal bracket (7), anchored to the perimeter edge of the pool by means of joining elements (8), which in turn comprises:
 - a central circular housing (12) for coupling the corresponding end (4, 5) of the rotary shaft (2); and
 - a bearing system (13), located around the central housing (12) and integrated in the bracket (7), for directly supporting and guiding of the rotation of the rotary shaft (2); and
- an external casing (9) for covering the bracket (7),

so that the ends (4, 5) of the rotary shaft (2) and the drive mechanism are completely housed inside their corresponding support foot (3) and protected from the elements.

2. Roller device according to claim 1, wherein the drive mechanism comprises:

- a drive motor (6) linked to the rotary shaft (2);

- a motor (6) rotation inverter; and
 - a limit switch mechanism (17) of the motor (6).
3. Roller device according to claim 2, wherein the motor (6) is located inside the motor end (5) of the rotary shaft (2). 5
4. Roller device according to any of the preceding claims, wherein the casing (9) comprises: 10
- a rear lid (10), facing towards the rotary shaft (2), which in turn comprises a central hole (16) that can be confronted with the central housing (12) of the bracket (7) to allow the passage of the corresponding end (4, 5) of the rotary shaft (2); and 15
 - a front lid (11), facing outwards.
5. Roller device according to claim 4, wherein the casing (9) additionally comprises a trim (20) made of aluminum sheet, engageable between the rear lid (10) and the front lid (11). 20
6. Roller device according to claims 4 or 5, wherein the front lid (11) of the casing (9) of the support foot (3) corresponding to the motor end (5) incorporates an opening and closing device. 25
7. Roller device according to any of the preceding claims, wherein the support foot (3) corresponding to the motor end (5) comprises: 30
- a removable mounting plate (14), for transmission of the motor torque of the drive mechanism; and 35
 - a connection box (15), integrated in the bracket (7), for inserting remote-control elements (21) of the device and electrical power connections.
8. Roller device according to any of the preceding claims, wherein the rotary shaft (2) has a slot or keyway type longitudinal housing (18), for fixing the cover (1) to said rotary shaft (2). 40
9. Roller device according to claim 8, wherein the rotary shaft (2) additionally comprises wedges (19) insertable in the respective ends of the housing (18) for ensuring the cylindrical continuity of the rotary shaft (2) with the bearing system (13). 45

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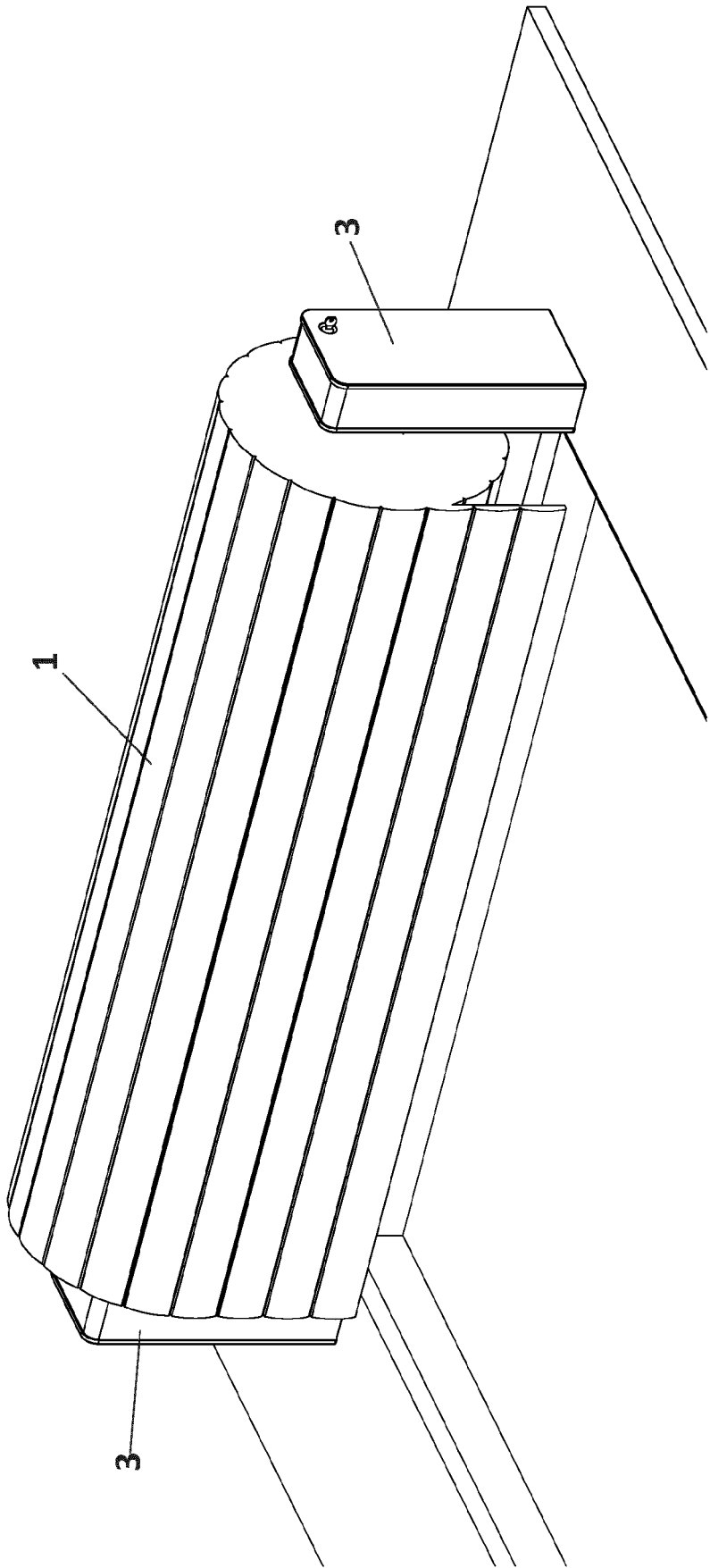


FIG. 1

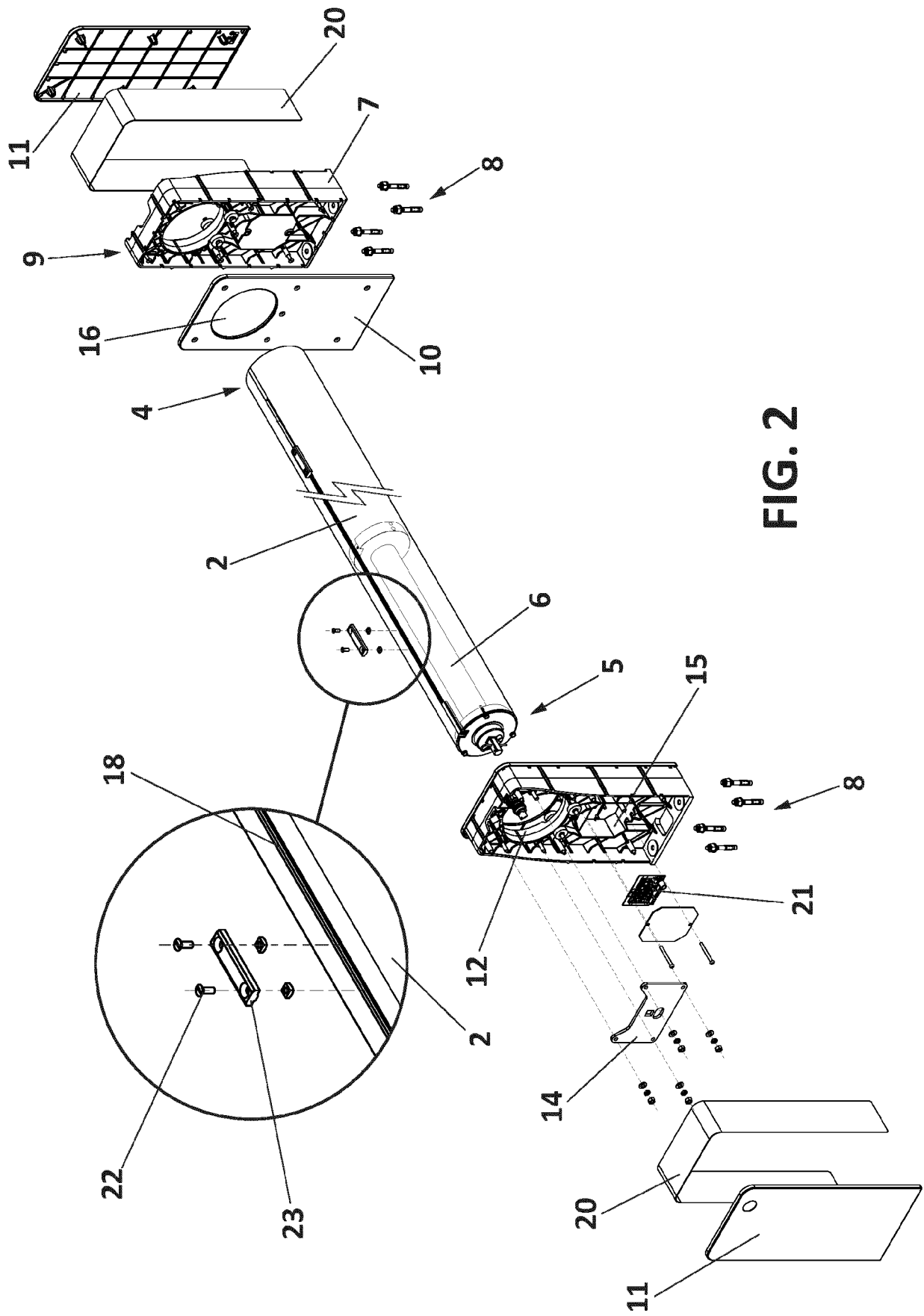


FIG. 2

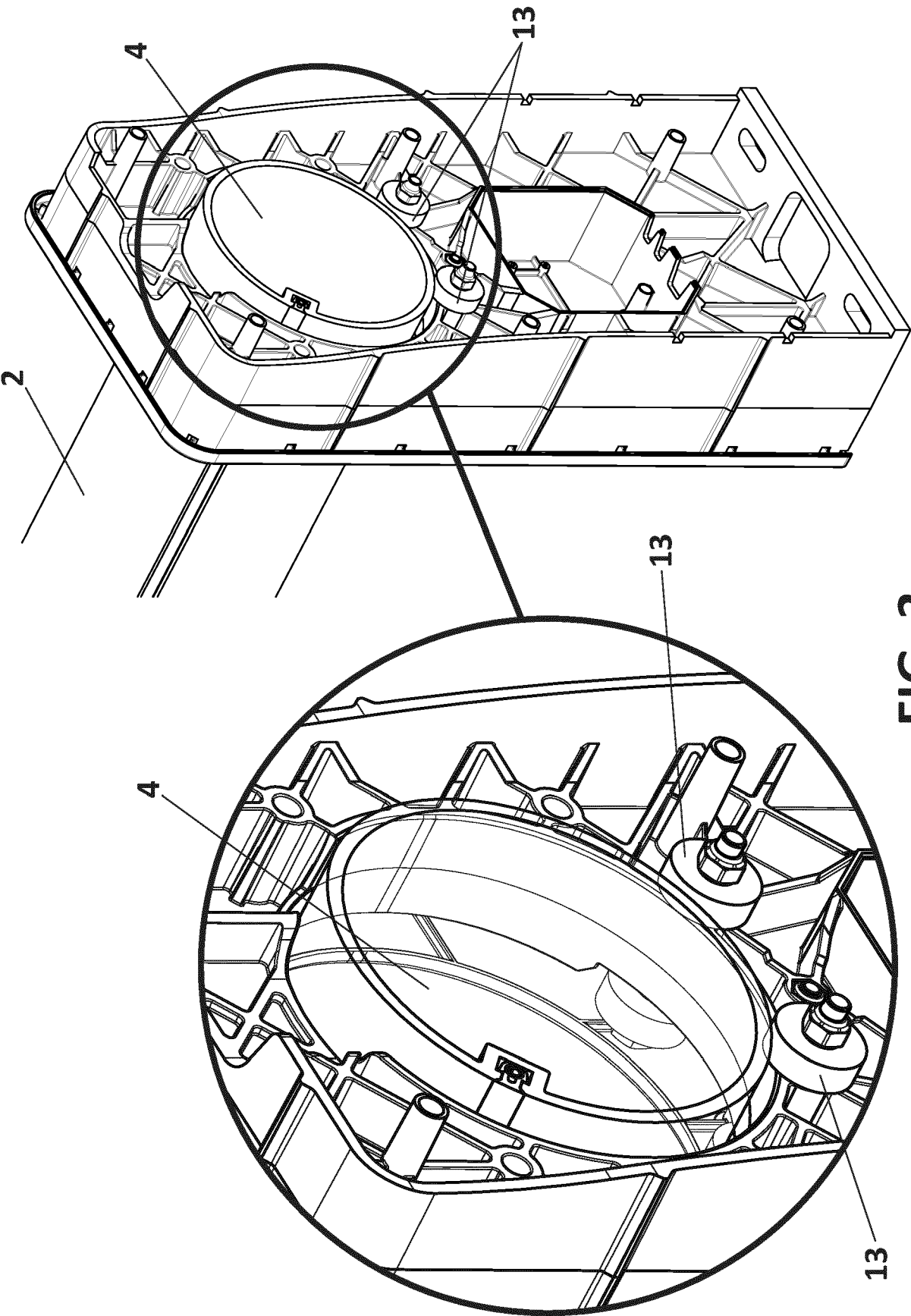


FIG. 3

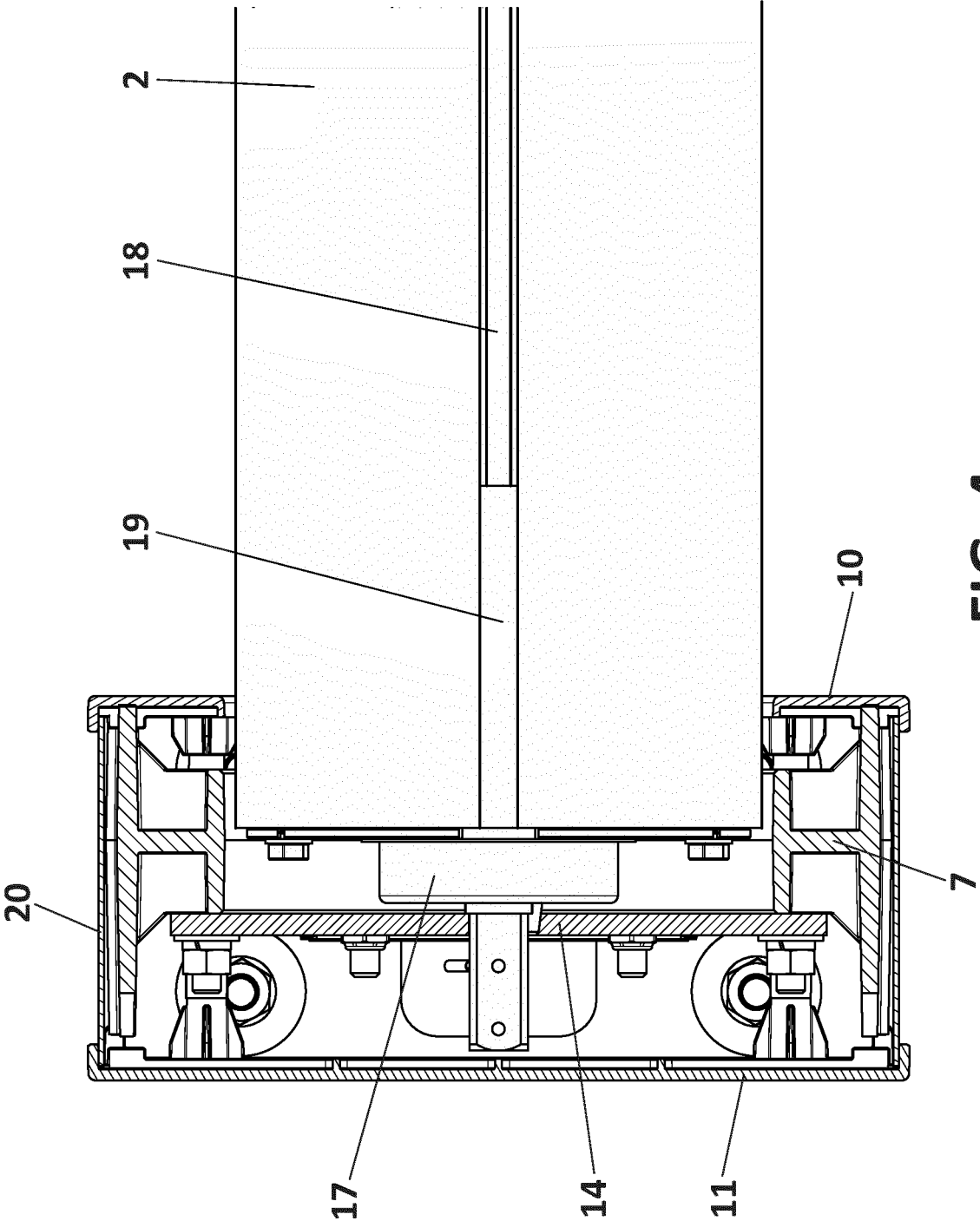


FIG. 4

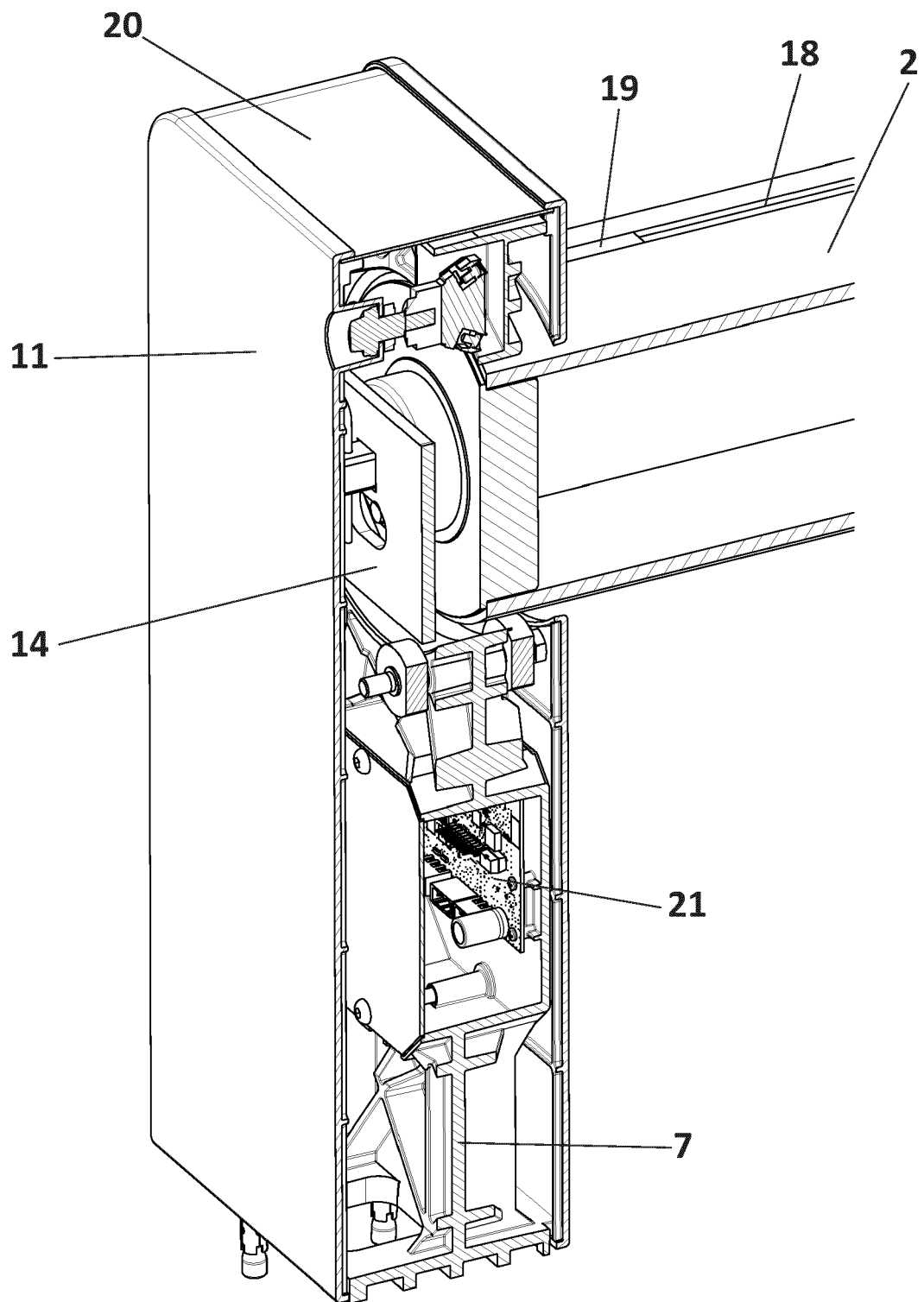


FIG. 5



EUROPEAN SEARCH REPORT

 Application Number
 EP 21 38 2084

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 13 July 2021	Examiner Decker, Robert
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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13-07-2021

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