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(54) A SYSTEM FOR COVERING A SWIMMING POOL

(57) A system for covering a swimming pool, comprising a sheet (T) which can be rolled around a drum (D). The winding and unwinding movements of the sheet are controlled by a motorized unit (2). The sheet (T) has a first end edge associated with the winding drum (D), two longitudinal side edges guided within stationary side guides (G) and a second end edge with which two traction cords are associated (C), for pulling the sheet (T) towards the unwound condition. The two traction cords (C) are engaged around return rollers (4), in such a way that each cord has a forward run (C1), which extends from the sheet (T), on a longitudinal extension of the sheet, and a return run (C2), ending up at a winding device (R) mounted coaxially to the winding drum (D) of the sheet (T). The motorized unit (2) comprises a first motor (M1) for controlling the winding drum (D) of the sheet, and a second motor (M2) for controlling the winding device of the two traction cords (C), which comprises two separate wheels (R) placed coaxially with the winding drum (D) of the sheet (T), adjacent to the two ends of the drum (D). The drum (D) has a tubular cylindrical body (11). The two winding wheels (R) of the two traction cords (C) are connected to each other by means of a central shaft (5) extending through the tubular body (11) of the drum (D). The second motor (M2) is mounted coaxially with the central shaft (5) and has an outlet shaft (18) connected in rotation with the central shaft (5). The first motor (M1) is mounted on an axis parallel to, and spaced apart from, the axis (6) of the central shaft (5), and controls the winding drum (D) of the sheet through a transmission (20, H, 21), for example, a chain transmission.

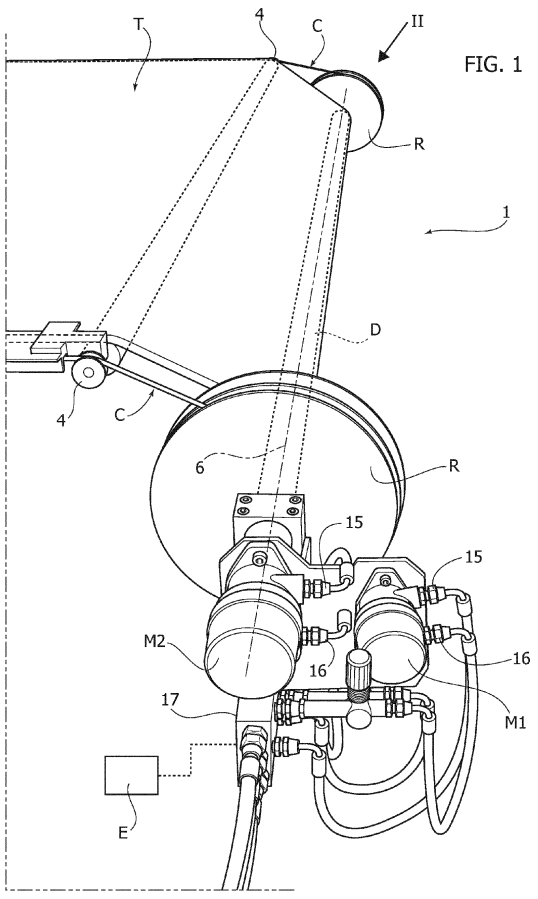

FIG. 1

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Description

Field of the invention

[0001] The present invention relates to a system for covering a swimming pool, of the known type comprising:

- a sheet for covering the pool, which can be rolled around a winding drum,
- a motorized unit for controlling a movement of the sheet between a position wound around the winding drum, for uncovering the pool, and a position unwound from the drum, for covering the pool,
- wherein the roll-up sheet has a first end edge associated with the winding drum, two longitudinal side edges guided within stationary side guides, and a second end edge with which two traction cords are associated, for pulling the sheet towards the condition unwound from the winding drum,
- wherein said traction cords are engaged around return rollers, which are freely rotatable about stationary axes, in such a way that each cord has a forward run, which extends from the sheet, on a longitudinal extension of the sheet, and a return run, ending up at a winding device mounted coaxially to the winding drum of the sheet,
- wherein said motorized unit comprises a first motor, for controlling the winding drum of the sheet, and a second motor, for controlling the winding device for winding the two traction cords,

Prior art

[0002] A covering system having the characteristics indicated above is, for example, described and illustrated in the document US 6,431,488 B1. In this known solution, the device for winding the traction cords of the sheet consists of a single winding roller, placed adjacent to one of the two ends of the winding drum of the sheet, and including two separate sections for winding the two cords. This arrangement involves the need to provide a system for guiding the return branches of the two traction cords, configured for returning both cords to said single winding roller. Since the forward branches of the two cords run along the two sides of the swimming pool, one of these cords is located on the opposite side to that in which the winding roller of the cords is located, which forces the use of a relatively complex return system of the cords. This greater complication of the guiding system of the traction cords of the sheet is also reflected in a greater complexity of the system for controlling the rotation of the motors that control the winding drum of the sheet and the roller for winding the traction cords, in order to obtain regular operation of the entire device.

[0003] A system for covering a swimming pool of the type indicated in the preamble of claim 1 is known from US 2 958 083 A. Similar covers are also known from EP 0 142 977 A, US 3 418 667 A, FR 2 908 402 A1 and US 3 885 255 A.

Object of the invention

[0004] The object of the present invention is to provide a covering system, which is at the same time simpler in construction and more reliable in operation than the known system described above.

[0005] Another object of the invention is to provide a covering system that does not require a complex control system of the two motors that control the rotation of the winding drum of the sheet and of the device for winding the traction cords of the sheet.

Summary of the invention

[0006] In view of achieving these and further objects, the invention relates to a system for covering a swimming pool having the characteristics of claim 1.

[0007] Thanks to the characteristics indicated above, each of the two traction cords of the sheet has its return branch that extends along a respective side of the swimming pool and ends at the respective winding wheel, located on the same side. This considerably simplifies the guiding system of the traction cords with respect to the known system which was mentioned in the preceding description, and also makes it easier and more reliable to check the operation of the device.

[0008] In a preferred embodiment, the system comprises a controller of said first motor and of said second motor which is programmed for:

- activating the first motor in the direction of winding the covering sheet on the aforesaid winding drum, when it is necessary to uncover the pool, and
- activating the second motor in the direction of winding the traction cords on the aforesaid winding wheels, when it is necessary to cover the pool.

[0009] The aforesaid controller is also programmed to place the second motor in a neutral condition when the first motor is active, and to place the first motor in a neutral condition when the second motor is active. Preferably, the two motors are hydraulic motors and the aforesaid neutral condition of each motor is a condition wherein the motor is made freely rotatable, by direct connection of the inlet and outlet for the hydraulic fluid in the motor.

Detailed description of a preferred embodiment

[0010] Further characteristics and advantages of the invention will become apparent from the description that follows with reference to the attached drawings, provided purely by way of non-limiting example, wherein:

- Figure 1 is a perspective view of a preferred embodiment of the system according to the invention,
- Figure 2 is another perspective view of a detail of

the system according to the invention, seen in the direction of the arrow II of Figure 1,

- Figure 3 is an elevational view of the system of Figures 1 and 2,
- Figures 4 and 5 are end views of the system of Figure 3,
- Figure 6 is a cross-sectional view along the line VI-VI of Figure 4,
- Figure 7 is a simplified and schematic view of a swimming pool equipped with a covering system according to the invention, and
- Figure 8 is a cross-sectional view along the line VIII-VIII of Figure 7.

[0011] In the drawings, the reference number 1 indicates - in its entirety - a system for covering the reservoir S of a swimming pool (visible in Figure 7). The system 1 includes a sheet T which can be rolled around a winding drum D (see in particular Figures 3 and 6).

[0012] The sheet T is wound around the drum D when it is necessary to uncover the pool, while it is unwound from the drum D when it is necessary to cover the pool. The winding and unwinding movements of the sheet T are controlled by a motorized unit which is indicated - in its entirety - by the reference 2 in Figures 3-6. As clearly visible in Figures 3-5, the motorized unit 2 is placed within a pit 3 (see also Figure 7) arranged near one end of the reservoir S of the swimming pool.

[0013] The sheet T has a first end edge associated with the drum D by means of fastening means of any known type.

[0014] When the sheet T is unwound from the drum D, the two longitudinal side edges of the sheet T slide within stationary guides G (Figures 7 and 8) arranged along the two sides of the pool. As can be seen in Figure 8, each side edge of the sheet T is in the form of a rope 14. Still with reference to the illustrated example and Figure 8, each guide G comprises two parallel channels. The respective side rope 14 of the sheet slides in the channel closest to the pool reservoir. This channel communicates with a narrow slot leading to the inner side of the guide G, to allow the passage of the sheet T. The reduced height of the slot with respect to the diameter of the side rope 14 safely prevents the rope 14 from slipping away from the guide G in a transverse direction to the guide.

[0015] In this way, when the sheet completely covers the swimming pool, applying a weight, even relatively high, above the sheet does not cause the side ropes 14 of the sheet T to slide off the guides G. This condition is necessary to guarantee adequate conditions of safety for one or more people (adults or children) who walk or jump over the sheet after it has been laid out on the swimming pool.

[0016] The end edge of the sheet T opposite to that which is connected to the winding drum D is connected on its two opposite sides to two traction cords. In the example illustrated, each traction cord C is arranged on the extension of a respective side rope of the sheet. Each cord C is engaged on return wheels 4 freely rotatable around stationary axes, so as to present a forward branch C1, which extends longitudinally on the extension of the respective side rope 14 of the sheet T, (see Figures 7, 8) and a return branch C2, which extends longitudinally on the same side of the pool up to a respective winding wheel R.

[0017] With reference, in particular, to Figures 1, 3 and 6, the system according to the invention has two separate wheels R, for winding the two traction cords C for pulling the sheet, which are mounted coaxially with the drum D for winding the sheet, adjacent to the two opposite ends of the sheet.

[0018] With reference to the preferred embodiment which is illustrated in Figure 6, each of the wheels R is connected in rotation with a central shaft 5, which is supported in rotation around a horizontal axis 6, by means of rolling bearings 7, from the upper ends of two stationary support columns 8.

[0019] In the specific example illustrated, each wheel R for winding the respective cord C comprises a hub 9 connected in rotation with the central shaft 5 and two parallel and spaced apart discs 10 which define between them the space for containing the turns of the respective traction cord C (which therefore winds in a spiral within the aforesaid space defined between the discs 10 of the wheel R).

[0020] As can still be seen in Figure 6, the drum D for winding the sheet comprises a cylindrical body 11 rotatably mounted by means of rolling bearings 12 over the central shaft 5, in such a way that the winding wheels R of the cords C, and the winding drum D of the sheet T, are free to rotate independently. Still in the case of the embodiment described herein, two discs 13 are mounted at the ends of the cylindrical body 11 for containing the turns of the sheet T. Figure 6 also illustrates the section of the sheet, with the two side edges forming the two ropes 14, which are intended to be retained and guided within the stationary guides G arranged along the two side edges of the swimming pool (Figures 7, 8).

[0021] With reference again to Figures 1 and 6, the unit 2 comprises a first hydraulic motor M1 for driving the drum D for winding the sheet T, and a second hydraulic motor M2 for controlling the rotation of the wheels R for winding the traction cords C. Both the motors M1 and M2 are hydraulic motors each having an inlet 15 and an outlet 16 for the hydraulic fluid, as well as a control unit 17 including a unit of solenoid valves for controlling the aforesaid inlets and outlets.

[0022] As can be seen in Figure 6, the motor M2 is mounted coaxially to the central shaft 5 and has an outlet shaft 18 which is connected in rotation with the shaft 5 by means of a joint 19 of any known type. The motor M1 is mounted with its axis arranged parallel and spaced apart from the axis of the motor M2 and controls the rotation of a gear 20 (see Figure 3) connected by a chain H with a gear 21 connected in rotation with the drum D for winding the sheet.

[0023] As visible in Figure 3 and in Figures 4 and 5, the system also includes a return roller 22 which guides the sheet T leaving the winding drum D, and which is mounted freely rotatable at its ends on supports 23 (Figure 3).

[0024] The control unit 17 for the motors M1, M2 is, in turn, controlled by an electronic controller E which is programmed for:

- activating the motor M1 in the winding direction of the sheet T on the drum D when it is necessary to uncover the pool,
- activating the motor M2 in the winding direction of the cords C on the wheels R, when it is necessary to cover the pool.

[0025] Furthermore, the controller E maintains the motor M2 in a neutral condition when the motor M1 is activated and keeps the motor M1 in a neutral condition when the motor M2 is activated. The "neutral condition" of the motor means a condition in which the motor is freely rotatable and/or is disconnected from its driven shaft.

[0026] In the case of a hydraulic motor, the neutral condition of the motor corresponds to a condition in which the hydraulic inlet and outlet of the motor are connected directly to each other, so that the motor is freely rotatable. In the case of use of an electric motor, the neutral condition could, for example, be the condition in which the electric motor is decoupled from its controlled member, by opening an electrically-operated clutch.

[0027] The operation of the system described above is as follows.

[0028] When the pool needs to be covered, the M2 motor is activated so as to wind the traction cords C over the two wheels R.

[0029] With reference to Figure 7, the cords C pull the sheet T over the reservoir S, making it unwind from the drum D. In this condition, the motor M1 is in its neutral condition, so that the drum D is able to rotate freely, following unwinding of the sheet T caused by the traction exerted by the cords C.

[0030] As already indicated above, when covering the swimming pool, the ropes 14 constituting the side edges of the sheet T are guided within the stationary guides G arranged along the two sides of the swimming pool and are retained within these guides, so as to ensure complete safety of the cover even in the case of applying a heavy weight above the sheet.

[0031] When it is necessary to uncover the pool, the motor M1 is activated, so as to rotate the drum D in the winding direction of the sheet T, while the motor M2 is placed in its neutral condition, so that the wheels R with the central shaft 5 that connects them are able to rotate freely following the unwinding of the cords C by the wheels R, which is caused by winding the sheet T around the drum D.

[0032] As is clear from the above description, the two traction cords C are wound around two separate wheels R placed adjacent to the two ends of the drum D for winding the sheet T. Therefore, each traction cord C has its return branch C2, which runs on one side of the pool and winds on a wheel R located on the same side, which considerably simplifies the guiding system of the traction cords with respect to the known solution that was discussed at the beginning of the present description.

[0033] Furthermore, the aforesaid greater simplicity of the guiding system of the traction cords C also determines a lower complexity and greater reliability of the rotation control system of the winding drum D and of the wheels R for winding the traction cords.

[0034] Of course, without prejudice to the principle of the invention, the details of construction and the embodiments may vary widely with respect to those described and illustrated here purely by way of example, without departing from the scope of the present invention, as defined by the attached claims.

Claims

1. A system for covering a swimming pool, comprising:

- a sheet (T) for covering the pool, which can be rolled around a winding drum (D),
- a motorized unit (2) for controlling a movement of the sheet (T) between a position wound around the winding drum (D), for uncovering the pool, and a position unwound from the drum (D), for covering the pool,
- wherein the roll-up sheet (T) has a first end edge associated with the winding drum (D), two longitudinal side edges guided within stationary side guides (G) and a second end edge with which two traction cords (C) are associated, for pulling the sheet (T) towards the condition unwound from the winding drum (D),
- wherein said traction cords (C) are engaged around return rollers (4), which are freely rotatable about stationary axes, in such a way that each cord has a forward run (C1), which extends from the sheet (T), on a longitudinal extension of the sheet, and a return run (C2), ending up at a winding device (R) mounted coaxially to the winding drum (D),
- wherein the winding device of the two traction cords (C) comprises two separate wheels (R), for winding, respectively, the two traction cords (C),
- wherein said wheels (R) for winding the traction cords (C) are placed coaxially with the drum (D) for winding the sheet (T), adjacent to the two opposite ends of the drum (D),
- wherein the winding drum (D) of the sheet (T) has a cylindrical tubular body (11) and the two winding wheels (R) for winding the two traction cords (C) are connected to each other by a cen-

tral shaft (5) extending through the tubular body (11) of the winding drum (D) for winding the sheet (T).

said covering system being **characterized in that**:

- said motorized unit (2) comprises a first motor (M1), for controlling the winding drum (D), and a second motor (M2), for controlling the winding device (R) for winding the two traction cords (C),
- said central shaft (5), which interconnects the two wheels (R) for winding the two traction cords (C) is rotatably supported by a stationary structure (8), while the cylindrical body (11) of the drum (D) for winding the sheet (T) is rotatably mounted above said central shaft (5).
- said second motor (M2) is mounted coaxially with said central shaft (5) and has an outlet shaft (18) connected in rotation with said central shaft (5),
- said first motor (M1) is mounted on an axis parallel to, and spaced apart from, the axis (6) of said central shaft (5), and controls the winding drum (D) of the sheet through a transmission (20, H, 21), for example, a chain transmission.

2. A system according to claim 1, **characterized in that** it comprises a controller (E) of said first motor (M1) and of said second motor (M2), said controller (E) being programmed for:

- activating said first motor (M1) in the direction of winding the covering sheet (T) on the aforesaid winding drum (D), when it is necessary to uncover the pool,
- activating said second motor (M2) in the direction of winding the traction cords (C) on the aforesaid winding wheels (R), when it is necessary to cover the pool,
- said controller (E) being also programmed to place the second motor (M2) in a neutral condition when the first motor (M1) is active, and to place the first motor (M1) in a neutral condition when the second motor is active (M2).

3. A system according to claim 2, **characterized in that** said first motor and said second motor (M1, M2) are hydraulic motors, and **in that** the neutral condition of each of said motors is a condition wherein the motor is freely rotatable .

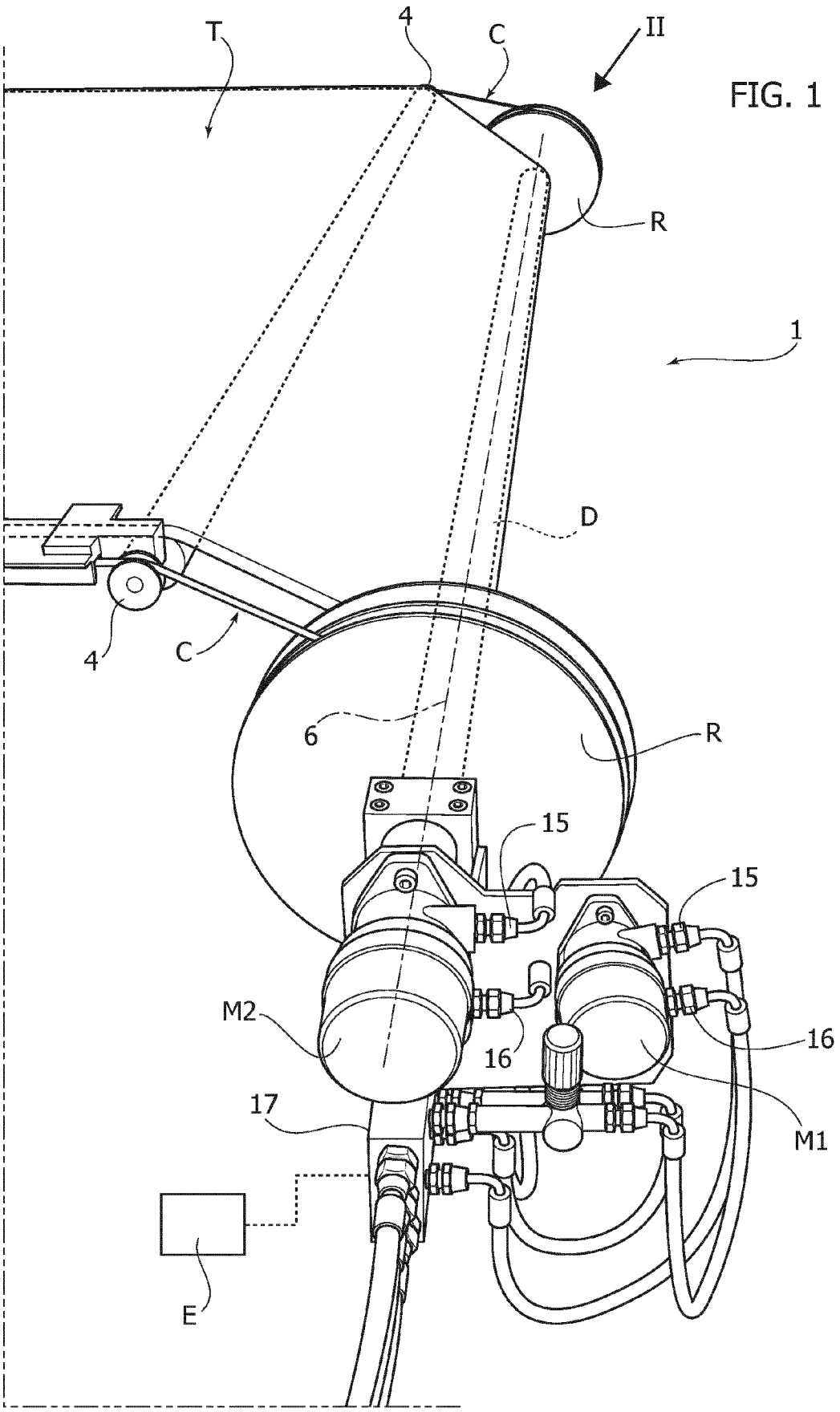


FIG. 1

FIG. 2

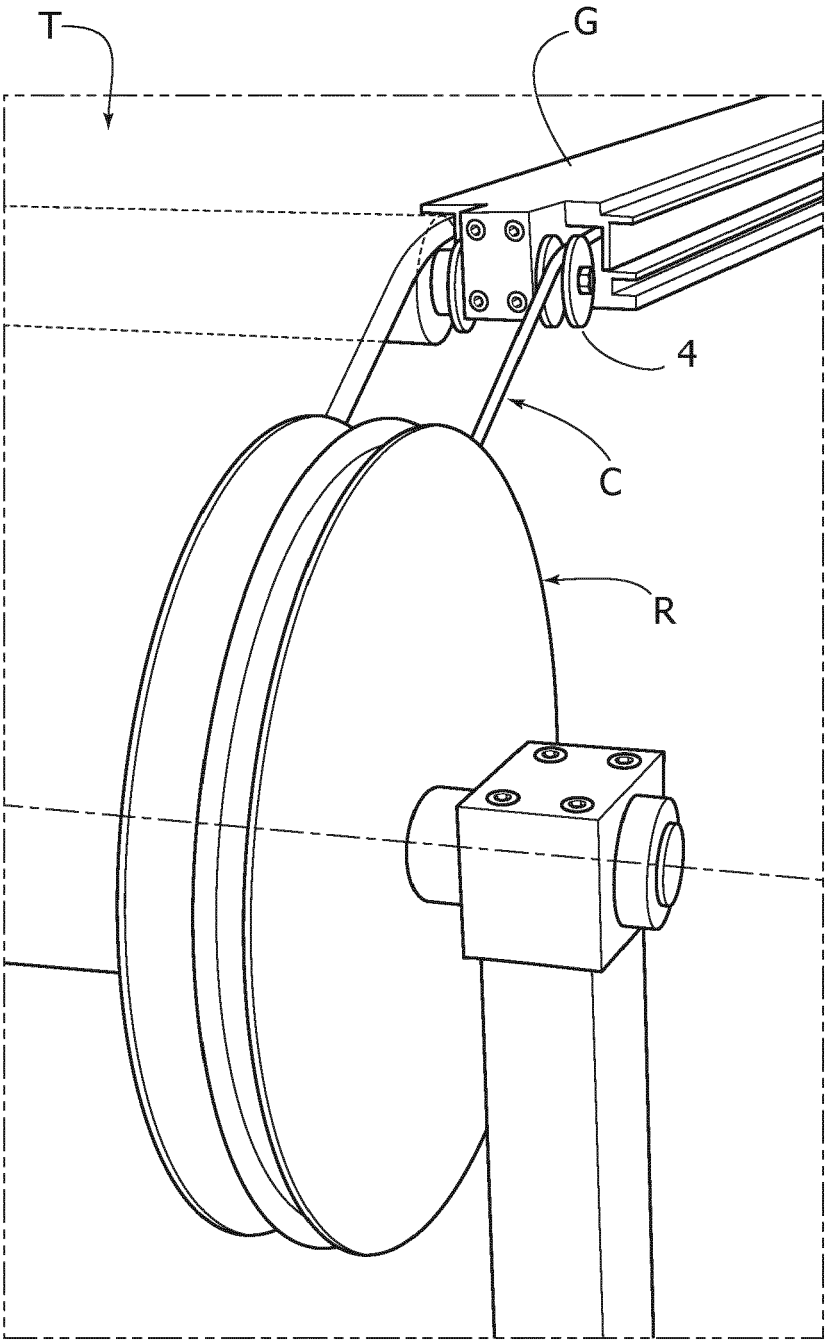


FIG. 3

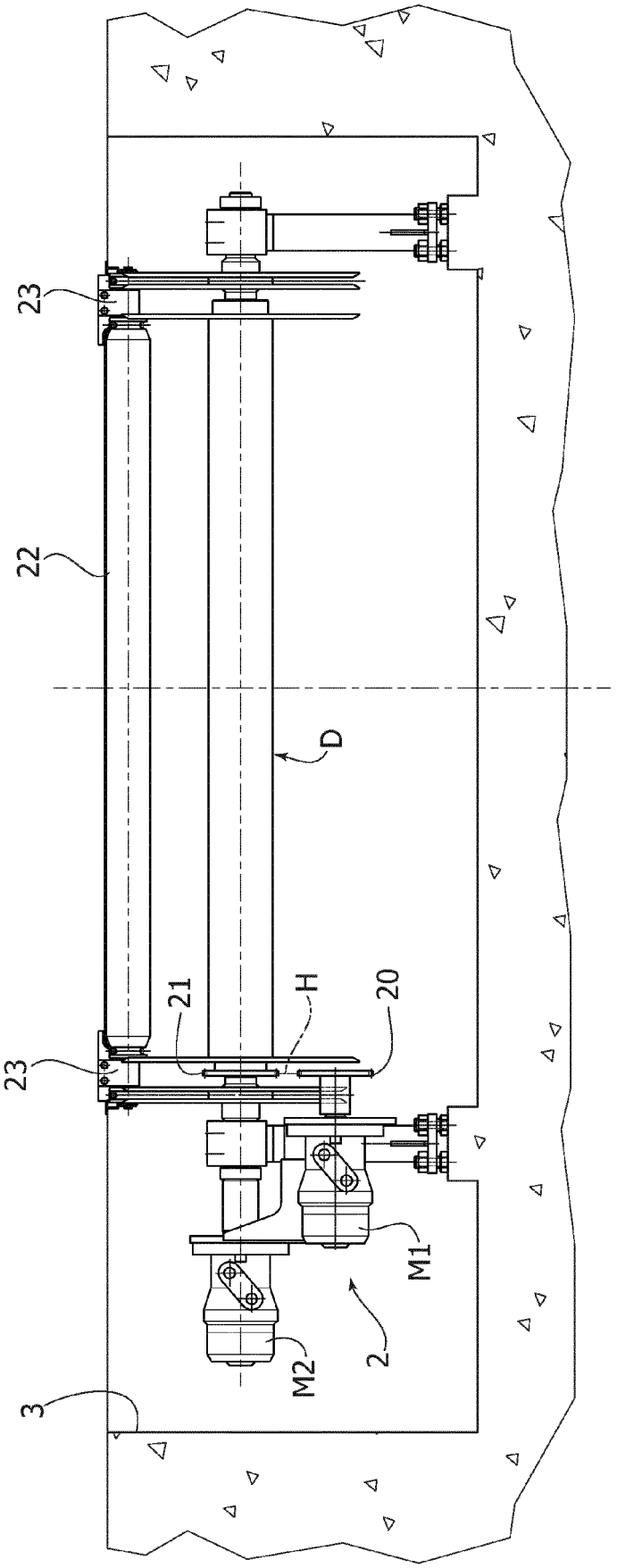


FIG. 4

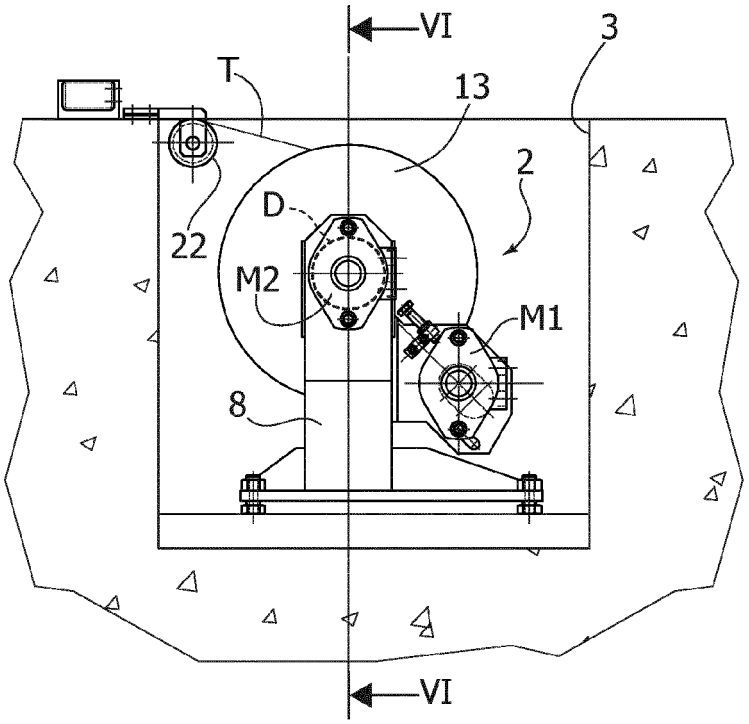


FIG. 5

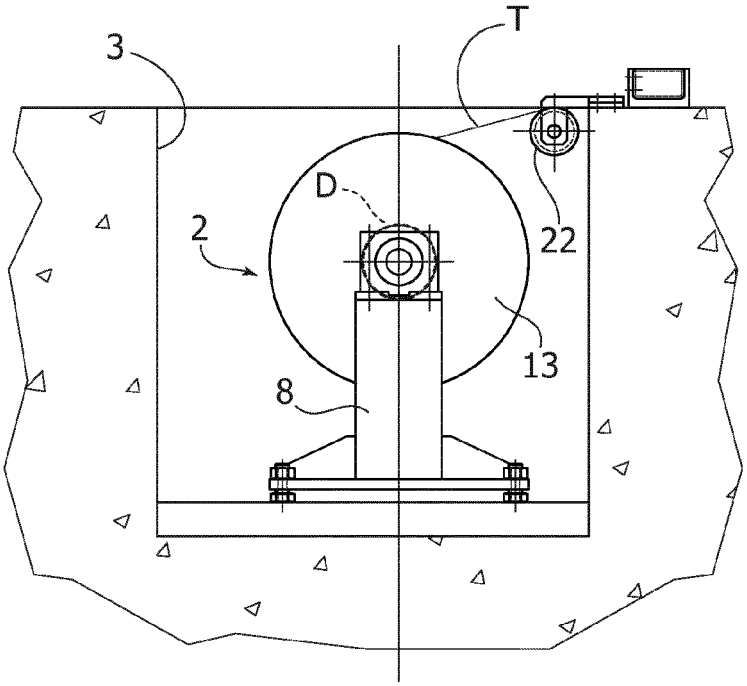
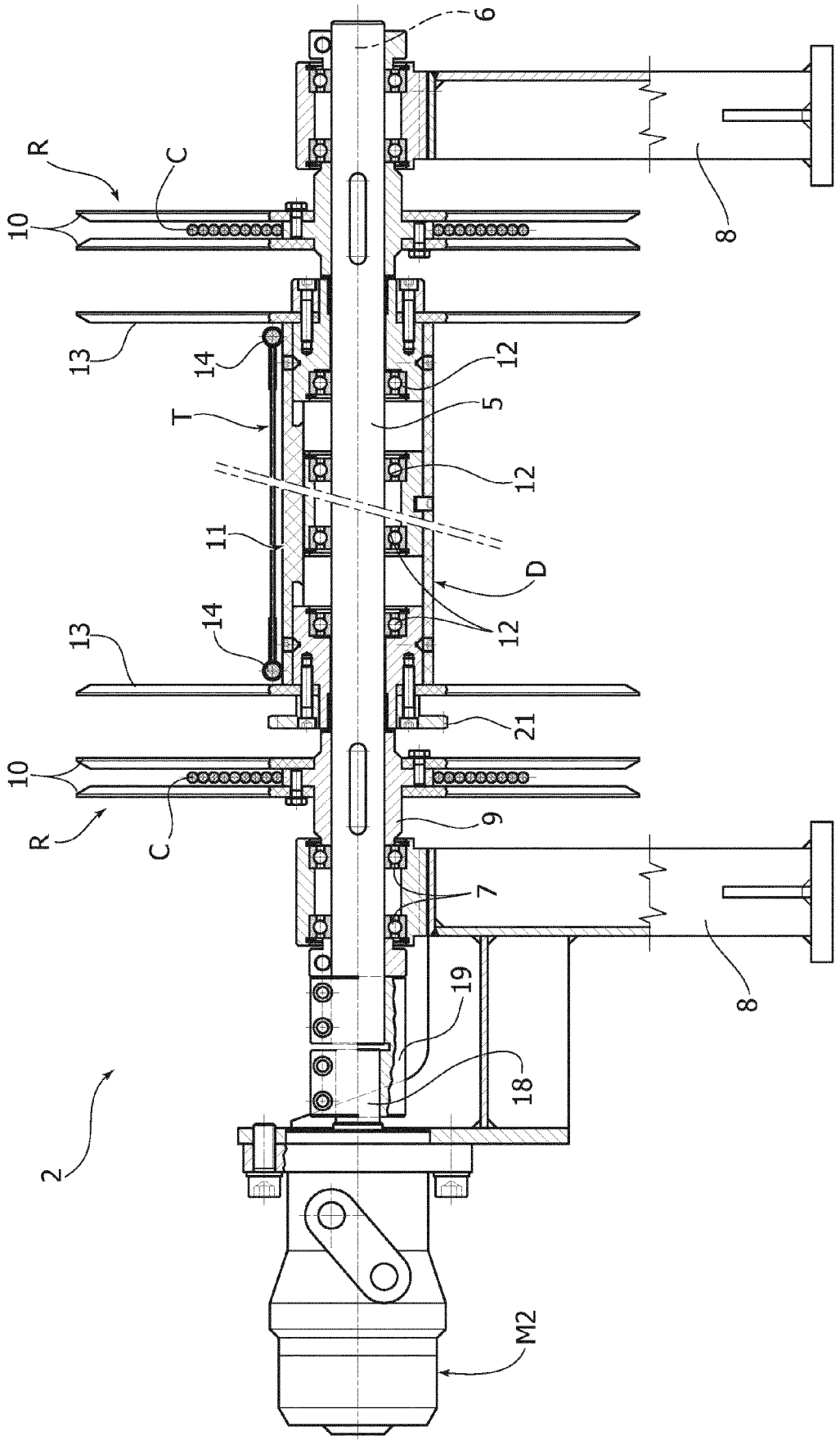


FIG. 6



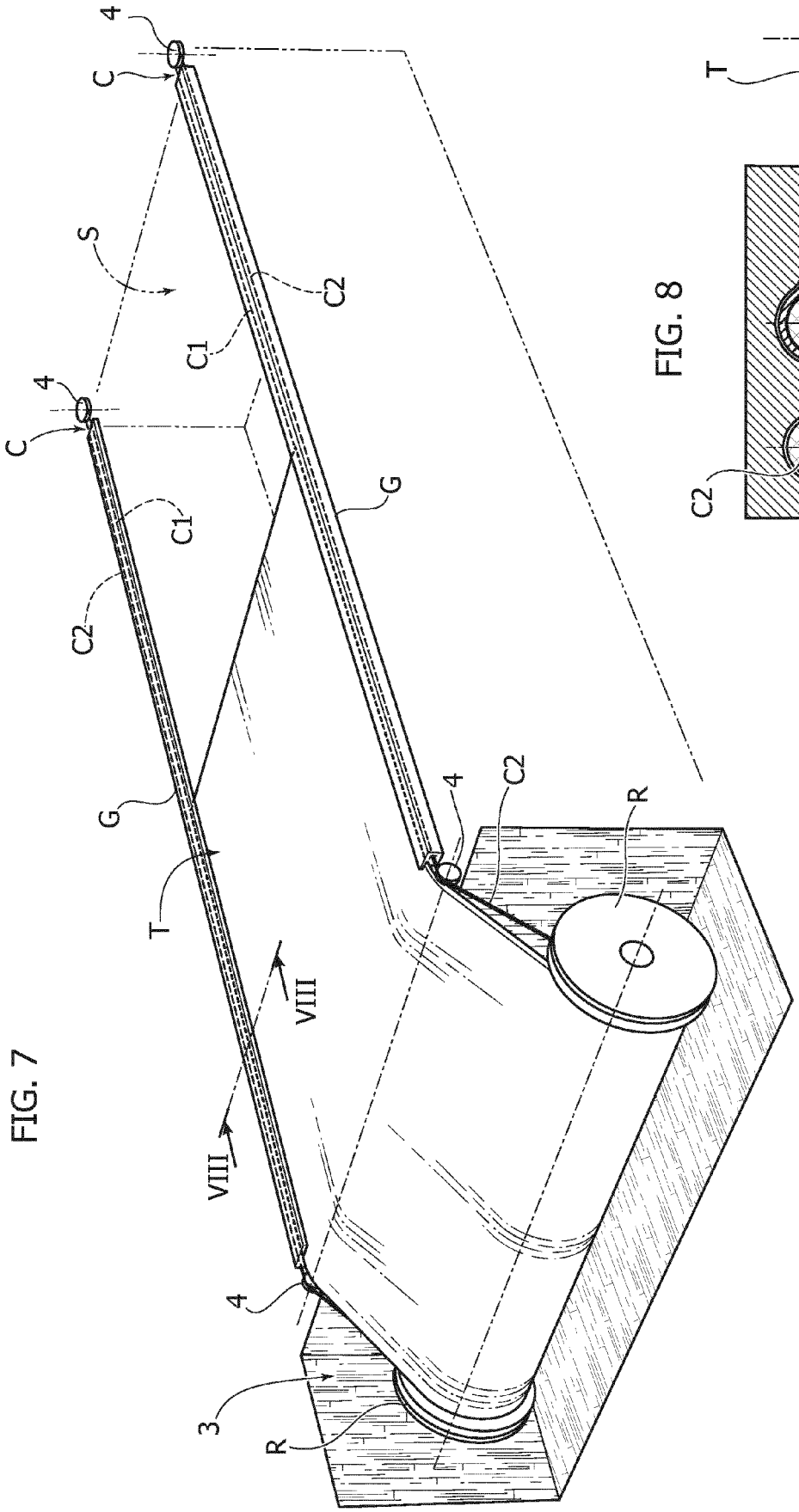


FIG. 7

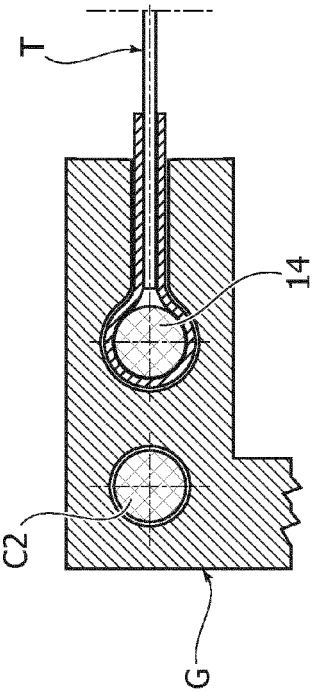


FIG. 8

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EUROPEAN SEARCH REPORT

Application Number
EP 20 18 7498

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	US 2 958 083 A (SHOOK MILES P ET AL) 1 November 1960 (1960-11-01) * column 1, lines 15-18; figures 1,6,7,5,4 * * column 2, lines 19-34 * * column 4, lines 10-23 *	1-3	INV. E04H4/08 B63B19/21 E04H4/10
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A	FR 2 908 402 A1 (HYDROLINE SA [FR]) 16 May 2008 (2008-05-16) * the whole document *	1-3	
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TECHNICAL FIELDS SEARCHED (IPC)

E04H
B63J
B63B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	23 November 2020	Valenta, Ivar

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