(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 321 164 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
29.06.2022 Bulletin 2022/26

(21) Application number: **17001823.8**

(22) Date of filing: **08.11.2017**

(51) International Patent Classification (IPC):
B63B 45/04 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
B63B 45/04

(54) LIGHT SIGNALING DEVICE FOR THE BOW OF A SHIP

LEUCHTSIGNALISIERUNGSVORRICHTUNG FÜR SCHIFFSBUG

DISPOSITIF DE SIGNALISATION LUMINEUSE POUR UNE PROUE DE BATEAU

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **14.11.2016 IT 201600114853**

(43) Date of publication of application:
16.05.2018 Bulletin 2018/20

(73) Proprietor: **SETEC S.p.A.**
10129 Torino (TO) (IT)

(72) Inventor: **Seminatore, Fabio**
10129 Torino (TO) (IT)

(74) Representative: **Aprà, Mario**
Aprà Brevetti
Via Bertola 2
10121 Torino (IT)

(56) References cited:
WO-A1-2013/131844
DE-U1-202011 050 508
US-A- 1 212 968
US-A1- 2013 039 081

EP 3 321 164 B1

Description

[0001] The present invention concerns a light signaling device for the bow of a ship.

[0002] A known light signaling device for the bow of a ship comprises a telescopic rod-shaped vertical support, fixed at the bottom with respect to the fixed structure of the ship, and a light signaling means supported at the top of said support, in which the telescopic rod-shaped vertical support is proportioned in height to the length of the ship and, for example, for a ship or yacht of 50 m can reach a height comprised between 8 and 10 m. Said vertical support comprises hydraulic cylinder means to control the extension/retraction of the telescopic components. These hydraulic means comprise a considerable amount of oil that, besides having a substantial weight, also causes undesirable soiling, for example during maintenance.

[0003] Moreover, the hydraulic cylinder means do not consent a convenient passage way to be produced through the rod-shaped support for the electrical cables branching off to the light signaling means and related electrical circuits, consequently complicating the structure of the device.

[0004] The present invention intends to provide a solution to the aforesaid problems.

[0005] Documents DE 20 2011 050508 U1 and US 2013/039081 A1 disclose a light signaling device comprising some features of claim 1. However, these devices require manual operation.

[0006] An object of the present invention is to provide a light signaling device for the bow of a ship with a simple, lightweight structure that does not require the use of hydraulic control means.

[0007] Another object of the present invention is to provide a signaling device as specified, which provides a direct and convenient passage way for the electrical cables branching off to the light signaling means and related electrical circuits.

[0008] In view of these objects, the present invention provides a light signaling device for the bow of a ship, the essential characteristic of which forms the subject matter of the main claim, while further advantageous characteristics of the invention are described in the dependent claims.

[0009] The present invention will become more apparent from the following detailed description, with reference to the drawing attached hereto, which is purely exemplary and therefore nonlimiting, wherein:

- Fig. 1A is an elevation view of the light signaling device for the bow of a ship according to the present invention, illustrated in a state of rest and without the light signaling means, which is supported fixed at the top thereof;
- Fig. 1B is a similar view to that of Fig. 1A, but in which the device according to the invention is illustrated in operating condition;
- Fig. 2 is an axial sectional view of the device of Fig. 1A, in a different scale and partially broken;
- Fig. 3 is an enlarged view of the lower part of the device of Fig. 2;
- Fig. 4 is a cross-sectional view of the detail of Fig. 3;
- Fig. 5 is an enlarged view of the upper part of the device of Fig. 2.

[0010] With reference to the drawing, the reference numeral 10 (Figs. 1A, 1B, 2) indicates in its entirety the light signaling device for the bow of a ship according to the invention. In the drawing, for simplification, said device is illustrated without the light signaling means, which is supported fixed at the top thereof, and the related electric circuit supply and control means of the light signaling means itself.

[0011] Said device 10 comprises an outer cylindrical tubular liner 11, which is fixed with axis vertical with respect to the fixed structure of the ship (not illustrated), for example underneath a bridge. Said liner 11 comprises within a telescopic tubular rod 15, to support the light signaling means, and which in Fig. 1A is illustrated retracted and in Fig. 1B extended with respect to the liner 11 itself.

[0012] With particular reference to Figs. 2 and 3, said tubular liner 11, for example made of stainless steel, has a lower cap 11.1 axially perforated and detachably attached to the liner itself. Said cap 11.1 supports, externally, a fixed box 11.2 containing therein, by means of bearing means 11.3, a helical worm wheel 12, coaxial and rotating freely with respect to said liner 11. A lower axial end of a first tubular lead screw 13 with trapezoidal outer thread is fixed coaxial, by means of a key, in said worm wheel 12 and extends axially along part of the height of said liner 11. A worm screw 12.1 with an essentially horizontal axis is meshed with respect to said worm wheel 12 and is kinematically connected with respect to an electrical gear-motor (not illustrated) that sets in rotation, when controlled, said worm screw 12.1 selectively in the two opposite directions of rotation, correspondingly setting in integral rotation said worm wheel 12 and said first lead screw 13.

[0013] A first nut screw 14, for example made of bronze, is engaged with trapezoidal screw helical fit with said first lead screw 13 and supports a first coaxial fixed annular plate 14.1.

[0014] Said first annular plate 14.1 supports a first fixed coaxial bush 14.2, proximal to said first lead screw 13, and a first fixed telescopic tubular section 15.1 of said telescopic tubular rod 15, distal from said first lead screw 13. Said first telescopic tubular section 15.1 is made, for example, of carbon.

[0015] A pair of guide rings 16 are coaxially fixed on the outside surface of said first telescopic tubular section 15.1 and have respective external axial grooves 16.1 (i.e., extending parallel to the axis of the liner 11) aligned with each other and engaged with a corresponding axial linear guide 16.2 attached to the inner surface of said

liner 11, for the entire length of the liner itself. By means of this arrangement said first telescopic tubular section 15.1 is translated, in the axial direction, integrally with said first nut screw 14, when said first lead screw 13 is set in rotation, while it is prevented from rotating with the nut screw itself.

[0016] Said first bush 14.2 supports a second bush 17.1 coaxial and above, with an intermediate coaxial bearing support 17.2 that allows said second bush 17.1 to rotate independently with respect to said first bush 14.2. Said second bush 17.1 is integral in rotation with respect to said first lead screw 13 by means of a key 17.3.

[0017] In said second bush 17.1 a lower axial end of a second lead screw 17, is fixed, tubular, external and coaxial with respect to said first lead screw 13. Said second lead screw 17, which has a trapezoidal external thread, extends axially along part of the height of said liner 11.

[0018] Above said second bush 17.1, a second nut screw 18, for example made of plastic material, is engaged with helical fit with said second tubular lead screw 17 and supports a second fixed coaxial annular plate 18.1.

[0019] Said second annular plate 18.1 supports a third fixed coaxial bush 18.2, proximal to said second lead screw 17, and a second fixed telescopic tubular section 15.2 of said telescopic tubular rod 15, distal from said second lead screw 17. Said second telescopic tubular section 15.2 is made, for example, of carbon.

[0020] A pair of guide rings 19 are coaxially fixed on the outside surface of said second telescopic tubular section 15.2 and have respective external grooves 19.1 axially aligned with each other and engaged with a corresponding axial linear guide 19.2 attached to the inner surface of said first telescopic tubular section 15.1, for the entire length of the tubular section itself. By means of this arrangement, said second telescopic tubular section 15.2 is translated, in the axial direction, integrally with said second nut screw 18, when said second tubular lead screw 17 is set in rotation integrally with said first lead screw 13 (integral with said second bush 17.1), while it is prevented from rotating with the second nut screw itself.

[0021] Said third bush 18.2 supports a fourth bush 20.1 coaxial and above, with an intermediate coaxial bearing support 20.2 that allows said fourth bush 20.1 to rotate independently with respect to said third bush 18.2. Said fourth bush 20.1 is integral in rotation with respect to said second lead screw 17 by means of a key 20.3.

[0022] In said fourth bush 20.1 a lower axial end of a third lead screw 20, is fixed, tubular, external and coaxial with respect to said second lead screw 17. Said third lead screw 20, which has a trapezoidal external thread, extends axially along part of the height of said liner 11.

[0023] Above said fourth bush 20.1, a third nut screw 21, for example made of plastic material, is engaged with helical fit with said third tubular lead screw 20 and supports a fixed coaxial tubular sleeve 21.1.

[0024] Said sleeve 21.1 supports, in turn, a third telescopic tubular section 15.3 of said telescopic tubular rod 15, coaxial with respect to said third lead screw 20. Said third telescopic tubular section 15.3 is made, for example, of carbon.

[0025] A pair of guide rings 22 are coaxially fixed on the outside surface of said third telescopic tubular section 15.3 and have respective external grooves axially aligned with each other and engaged with a corresponding axial linear guide 22.2 attached to the inner surface of said second telescopic tubular section 15.2, for the entire length of the tubular section itself. By means of this arrangement said third telescopic tubular section 15.3 is translated, in the axial direction, integrally with said third nut screw 21, when said third tubular lead screw 20 is set in rotation (by means of said fourth bush 20.1 integral with said second lead screw 17) integrally with said first lead screw 13, while it is prevented from rotating with the third nut screw itself.

[0026] As is apparent from the above, the light signaling device for the bow of a ship 10 according to the present invention comprises, within the tubular outer liner 11, a telescopically extensible/retractable rod with three telescopic stages, each of which respectively includes:

- a lead screw (13, 17, 20),
- a nut screw (14, 18, 21) engaged with helical fit with said lead screw,
- a corresponding telescopic tubular section (15.1, 15.2, 15.3) connected, by means of respective support means (14.1, 18.1, 21.1), to said nut screw (14, 18, 21) and which is translated, in the axial direction, integrally with said nut screw, when said lead screw is set in rotation, while it is prevented from rotating with the nut screw itself.

[0027] Said lead screws (13, 17, 20) are integral to one another in rotation and receive the motion from electrical gear-motor means by transmission means (12, 12.1) kinematically connected to one (13) of said lead screws.

[0028] Said lead screws (13, 17, 20) are tubular, coaxial and provided with external thread.

[0029] With particular reference to Figs. 2 and 5, said tubular outer liner 11 has, at the top thereof, an annular cover 11.4, through which the free upper end of said first telescopic section 15.1 is guided by means of corresponding annular sealing means. Said first telescopic section 15.1 has an outer flange 15.10 in the proximity of the upper end that, when said first telescopic section is retracted in the liner 11, rests on said cover 11.4. Moreover, said first telescopic section 15.1 has, at the top thereof, an annular cover 15.11, through which the free upper end of said second telescopic section 15.2 is guided by means of corresponding annular sealing means.

[0030] Analogously, said second telescopic section 15.2 has, at the top thereof, an annular cover 15.21, through which the free upper end of said third telescopic section (15.3) is guided by means of corresponding annular sealing means.

[0031] An annular cover 15.30 partially closes the free top of said third telescopic section (15.3) and has an axial through hole (15.31) aligned with the axial cavities of said three lead screws 13, 17 and 20. It can be noted that the fixed box 11 has an opening for housing a fixed sleeve 11.5, axially aligned with said hole 15.31 of the cover 15.30.

[0032] By means of this arrangement, the device 10 according to the invention provides a free axial passage way, through the box 11 and said sleeve 11.5, the lead screws 13, 17, 20, the tubular telescopic sections 15.1, 15.2, 15.3 and said axial hole 15.31 of the cover 15.30, for example for the electrical cables, branching off to the light signaling means (which is fixed, for example, at the top of said third telescopic section 15.3) and related electric circuit supply and control means.

[0033] An automatic winder/unwinder device of electrical cables, know per se and not illustrated, can be provided in proximity of the fixed box 11, to facilitate the unwinding and rewinding operations of said electrical cables, during the extension/retraction of the telescopic support rod 15.

[0034] The operation of the light signaling device 10 for the bow of a ship is easily understood. Starting from the condition illustrated in Fig. 1A, in which the three telescopic sections 15.1, 15.2, 15.3 are axially retracted at rest in the tubular liner 11, an operator sets in rotation (by means of corresponding gear-motor means) the worm screw 12.1 and therefore the helical worm wheel 12 in the direction suitable for extension of said telescopic sections. Consequently, the three lead screws 13, 17, 20, which have respective threads with the same pitch, rotate integrally. Therefore, at each rotation of each screw, the corresponding lead screws 14, 18, 21 translate linearly and automatically all by a same distance and determine a corresponding unthreading or extension of the respective tubular telescopic sections with one another and of the section 15.1 with respect to the tubular liner 11, with the same pitch, until reaching the operating arrangement, in which the telescopic rod-shaped vertical support 15 is fully extended, as illustrated in Fig. 1B. During the extension of said rod-shaped support 15, the electrical cables connected to the light signaling means and related electric circuit supply and control means, are unwound automatically by said winder/unwinder and are arranged along the axial passage way through the box 11, the lead screws 13, 17, 20, the tubular telescopic sections 15.1, 15.2, 15.3 and the axial hole 15.31 of the cover 15.30.

[0035] When the rotation of said gear-motor means is reversed, said tubular telescopic sections 15.1, 15.2, 15.3 of said telescopic support rod 15 retract within the tubular liner 11, in the condition of Fig. 1A, in which the flange 15.10 and the covers 11.4, 15.11, 15.21 and 15.30, respectively, together with the corresponding sealing gaskets, ensure suitable resistance to atmospheric agents.

[0036] As is apparent from the foregoing description, the light signaling device for the bow of a ship according to the present invention allows the objects set forth in the preamble to be achieved in a simple and effective way.

[0037] In fact, the present invention provides a light signaling device for the bow of a ship with a simple, lightweight structure that does not require the use of hydraulic control means.

[0038] Moreover, the present invention consents the production of a signaling device as specified, which provides a direct and convenient passage way for the electrical cables branching off to the light signaling means and related electrical circuits.

Claims

1. A light signaling device (10) for the bow of a ship, the light signaling device (10) including a tubular outer liner (11), a support rod (15) with multiple telescopically extensible/retractable stages (15.1, 15.2, 15.3),

wherein a first of said telescopically extensible/retractable stages includes:

- a first lead screw (13);
- a first nut screw (14, 14.1) engaged with helical fit with said lead screw (13),
- a corresponding first telescopic tubular section (15.1) coaxial and connected, by means of respective support means, with respect to said first nut screw (14), and which translates in the axial direction, integrally with said first nut screw (14), when said lead screw is set in rotation, while it is prevented from rotating with the nut screw itself by means of linear guide means;

wherein a second of said telescopically extensible/retractable stages includes:

- a second lead screw (17);
- a second nut screw (18) engaged with helical fit with said lead screw (17),
- a corresponding second telescopic tubular section (15.2) coaxial and connected, by means of respective support means, with respect to said second nut screw (18), wherein the second telescopic tubular section (15.2) translates in the axial direction, integrally with said second nut screw (18), when said second lead screw (17) is set in rotation, while it is prevented from rotating with the second nut screw itself by means of linear guide means;

wherein said first lead screw (13) receives the motion from electrical gear-motor means by

transmission means (12, 12.1) kinematically connected to said first lead screw (13), and wherein said first (13) and second (17) lead screws are tubular, coaxial and provided with external thread,
wherein the light signaling device (10) further comprises:

- a first bush means (14.2) fixedly supported by said first nut screw (14, 14.1),
- a first intermediate bearing support means (17.2) coaxially supported by said first bush means (14.2), and
- a second bush means (17.1) coaxially supported by said first intermediate bearing support means (17.2), wherein said second bush means (17.1) is integral in rotation with respect to said first lead screw (13) by means of a key (17.3), the outer surface of the first lead screw (13) comprising a groove extending along its length in which said key (17.3) is protruding,

wherein a lower axial end of said second lead screw (17) is fixed in said second bush means (17.1), outer and coaxially with respect to said first lead screw (13).

2. Light signaling device (10) according to claim 1, wherein a third of said telescopically extensible/ retractable stages (15.3) includes:

- a third lead screw (20);
- a third nut screw (21) engaged with helical fit with said third lead screw (20),
- a corresponding third telescopic tubular section (15.3) coaxial and connected, by means of respective support means, with respect to said third nut screw (21), wherein the third telescopic tubular section (15.3) translates in the axial direction, integrally with said third nut screw (21), when said third second lead screw (20) is set in rotation, wherein the third telescopic tubular section (15.3) and the second nut screw (21) are preventing from rotating by means of linear guide means;
- a third bush means (18.2) fixedly supported by said second nut screw (18), a second intermediate bearing support (20.2) coaxially supported by said third bush means (18.2),
- a fourth bush means (20.1) coaxially supported by said second intermediate bearing support (20.2), wherein said fourth bush means (20.1) is integral in rotation with respect to said second lead screw (17) by means of a key (20.3), the outer surface of the second lead screw (17) comprising a groove extending along its length in which said key (20.3) is protruding, and
- wherein said third lead screw (20) is tubular and provided with external thread, wherein a lower axial end of said third lead screw (20) is fixed in said fourth bush means (20.1), outer and coaxial with respect to said second lead screw (17) and engaged with helical fit with said third nut screw (21).

3. Signaling device (10) according to claim 1, wherein said linear guide means (16, 19, 22; 16.1, 19.1; 16.2, 19.2;, 22.2) comprise of guide rings (16, 19, 22) coaxially fixed on the outside surface of a respective telescopic tubular section (15.1, 15.2, 15.3) and presenting respective external grooves (16.1, 19.1) axially aligned with each other and engaged with corresponding axial linear guide means (16.2 , 19.2, 22.2) attached to the inner surface of said liner (11), respectively of the adjacent telescopic tubular section (15.1, 15.2).

4. Light signaling device (10) according to one or more of the claims 2 to 3, wherein:

- said tubular outer liner (11) has, at the top thereof, an annular cover (11.4), through which the free upper end of said first telescopic section (15.1) is guided by means of corresponding annular sealing means;
- said first telescopic section (15.1) has, at the top thereof, an annular cover (15.11), through which the free upper end of said second telescopic section (15.2) is guided by means of corresponding annular sealing means;
- said second telescopic section (15.2) has, at the top thereof, an annular cover (15.21), through which the free upper end of said third telescopic section (15.3) is guided by means of corresponding annular sealing means;
- an annular cover (15.30) partially closes the free top of said third telescopic section (15.3) and has an axial through hole (15.31) aligned with the axial cavities of said lead screws (13, 17, 20),
and wherein said device (10) comprises a free axial passage way provided through said lead screws (13, 17, 20), said telescopic tubular sections (15.1, 15.2, 15.3) and said axial hole (15.31) of the cover (15.30), for electric cables, branching off to the light signaling means and related electric circuit supply and control means.

5. Light signaling device (10) according to claim 4, wherein said first telescopic section (15.1) has an outer flange (15.10) in the proximity of the upper end.

Patentansprüche

1. Leuchtsignalvorrichtung (10) für den Bug eines Schiffes, wobei die Leuchtsignalvorrichtung (10) eine rohrförmige äußere Verkleidung (11), eine Stützstange (15) mit mehreren teleskopisch ausfahrbaren/einziehbaren Stufen (15.1. 15.2, 15.3) umfasst,

wobei eine erste der besagten teleskopisch ausfahrbaren/einziehbaren Stufen Folgendes umfasst:

- eine erste Leitspindel (13),
- eine erste Mutterschraube (14, 14.1), die mit der besagten Leitspindel (13) schraubenförmig gekoppelt ist,
- einen entsprechenden ersten teleskopischen rohrförmigen Abschnitt (15.1), der koaxial und durch entsprechende Haltemittel in Bezug auf die besagte erste Mutterschraube (14) verbunden ist, und sich in axialer Richtung, fest verbunden mit der besagten Mutterschraube (14) verschiebt, wenn die besagte Leitspindel in Drehung versetzt wird, während sie mittels linearer Führungsmittel daran gehindert wird, sich mit der Mutterschraube zu drehen;

wobei eine zweite der besagten teleskopisch ausfahrbaren/einziehbaren Stufen Folgendes umfasst:

- eine zweite Leitspindel (17),
- eine zweite Mutterschraube (18), die mit der besagten Leitspindel (17) schraubenförmig gekoppelt ist,
- einen entsprechenden zweiten teleskopischen rohrförmigen Abschnitt (15.2) der koaxial und durch entsprechende Haltemittel in Bezug auf die besagte zweite Mutterschraube (18) verbunden ist,

wobei sich der zweite rohrförmige teleskopische Abschnitt (15.2) in axialer Richtung, fest verbunden mit der besagten zweiten Mutterschraube (18) verschiebt, wenn die besagte zweite Leitspindel (17) in Drehung versetzt wird, während sie mittels linearer Führungsmittel daran gehindert wird, sich mit der zweiten Mutterschraube zu drehen;
wobei die besagte erste Leitspindel (13) die Bewegung von elektrischen Getriebemotormitteln mittels Übertragungsmitteln (12, 12.1) ableitet, die mit der besagten ersten Leitspindel (13) kinematisch verbunden sind, und
wobei die besagte erste (13) und die zweite (17) Leitspindel rohrförmig, koaxial und mit einem Außengewinde versehen sind, wobei die Leuchtsignalvorrichtung (10) weiterhin Folgendes umfasst:

- erste Hülsenmittel (14.2), die fest von der besagten ersten Mutterschraube (14, 14.1) getragen werden,
- erste mittlere Lagerhaltemittel (17.2) die in koaxialer Anordnung von den besagten ersten Hülsenmitteln (14.2) getragen werden, und
- zweite Hülsenmittel (17.1), die in koaxialer Anordnung von den besagten ersten mittleren Lagerhaltemittel (17.2) getragen werden, wobei die besagten zweiten Hülsenmittel (17.1) bei Drehung in Bezug auf die besagte erste Leitspindel (13) mittels eines Keils (17.3) fest verbunden sind, wobei die Außenfläche der ersten Leitspindel (13) eine sich über ihre Länge erstreckende Nut aufweist, in die der besagte Keil (17.3) hineinragt,

wobei ein unteres axiales Ende der besagten zweiten Leitspindel (17) in den besagten zweiten Hülsenmitteln (17.1), außerhalb und koaxial in Bezug auf die besagte erste Leitspindel (13), befestigt ist.

2. Leuchtsignalvorrichtung (10) gemäß Anspruch 1,

wobei
ein Drittel der besagten teleskopisch ausfahrbaren/einziehbaren Stufen Folgendes einschließt:

- eine dritte Leitspindel (20),
- eine dritte Mutterschraube (21), die mit der besagten dritten Leitspindel (20) schraubenförmig gekoppelt ist,
- einen entsprechenden dritten teleskopischen rohrförmigen Abschnitt (15.3) der koaxial und durch entsprechende Haltemittel in Bezug auf die besagte dritte Mutterschraube (21) verbunden ist, wobei sich der dritte teleskopische rohrförmige Abschnitt (15.3) in axialer Richtung, fest verbunden mit der besagten dritten Mutterschraube (21), verschiebt, wenn die besagte dritte Leitspindel (20) in Drehung versetzt wird, wobei der dritte teleskopische rohrförmige Abschnitt (15.3) und die dritte Mutterschraube (21) mittels linearer Führungsmittel daran gehindert werden, sich zu drehen;
- dritte Hülsenmittel (18.2), die fest von der besagten zweiten Mutterschraube (18) getragen werden, zweite mittlere Lagerhaltemittel (20.2), die in koaxialer Anordnung von den besagten dritten Hülsenmitteln (18.2) getragen werden,
- vierte Hülsenmittel (20.1), die in koaxialer

Anordnung von den besagten zweiten mittleren Lagerhaltemittel (20.2) getragen werden, wobei die besagten vierten Hülsenmittel (20.1) bei Drehung in Bezug auf die besagte zweite Leitspindel (17) mittels eines Keils (20.3) fest verbunden sind, wobei die Außenfläche der zweiten Leitspindel (17) eine sich über ihre Länge erstreckende Nut aufweist, in die der besagte Keil (20.3) hineinragt, und

- wobei die besagte dritte Leitspindel (20) rohrförmig und mit einem Außengewinde versehen ist, wobei ein unteres axiales Ende der besagten dritten Leitspindel (20) an den besagten vierten Hülsenmitteln (20.1), außerhalb und koaxial in Bezug auf die besagte zweite Leitspindel (17), befestigt und mit der besagten dritten Leitspindel (21) schraubenförmig gekoppelt ist.

3. Leuchtsignalvorrichtung (10) gemäß Anspruch 1, wobei die besagten linearen Führungsmittel (16, 19, 22; 16.1, 19.1; 16.2, 19.2, 22.2) Führungsringe (16, 19, 22) umfassen, die koaxial an der Außenfläche eines jeweiligen teleskopischen rohrförmigen Abschnitts (15.1, 15.2, 15.3) befestigt sind und jeweilige äußere axiale Nuten (16.1, 19.1) aufweisen, die zueinander ausgerichtet sind und mit entsprechenden axialen linearen Führungsmitteln (16.2, 19.2, 22.2) in Anspruch genommen werden, die an der Innenfläche der besagten Verkleidung (11), bzw. des angrenzenden teleskopischen rohrförmigen Abschnitts (15.1, 15.2) befestigt sind.

4. Leuchtsignalvorrichtung (10) gemäß einem oder mehreren der Ansprüche von 2 bis 3, wobei:

- die besagte äußere rohrförmige Verkleidung (11) an ihrem oberen Ende eine ringförmige Abdeckung (11.4) aufweist, durch die mittels entsprechender ringförmiger Dichtungsmittel das freie obere Ende des besagten ersten teleskopischen Abschnitts (15.1) geführt wird;
- der besagte erste teleskopische Abschnitt (15.1) an seinem oberen Ende eine ringförmige Abdeckung (15.11) trägt, durch die mittels entsprechender ringförmiger Dichtungsmittel das freie obere Ende des besagten zweiten teleskopischen Abschnitts (15.2) geführt wird;
- der besagte zweite teleskopische Abschnitt (15.2) an seinem oberen Ende eine ringförmige Abdeckung (15.21) trägt, durch die mittels entsprechender ringförmiger Dichtungen das freie obere Ende des besagten dritten teleskopischen Abschnitts (15.3) geführt wird;
- eine ringförmige Abdeckung (15.30) teilweise das freie obere Ende des besagten dritten teleskopischen Abschnitts (15.3) verschließt und ein axiales Durchgangsloch (15.31) aufweist, das mit den axialen Aussparungen der besagten Leitspindeln (13, 17, 20) ausgerichtet ist,

und wobei die besagte Vorrichtung (10) einen freien axialen Durchgang umfasst, der durch die besagten Leitspindeln (13, 17, 20), die besagten teleskopischen rohrförmigen Abschnitte (15.1, 15.2, 15.3) und das besagte axiale Loch (15.31) der Abdeckung (15.30) für elektrische Kabel vorgesehen ist, die zu dem Leuchtsignalmittel und den entsprechenden Versorgungs- und Steuerschaltungsmitteln abgehen.

5. Leuchtsignalvorrichtung (10) gemäß Anspruch 4, wobei der besagte erste teleskopische Abschnitt (15.1) in der Nähe des oberen Endes einen äußeren Flansch (15.10) aufweist.

Revendications

1. Dispositif de signalisation lumineuse (10) pour la proue d'un navire, le dispositif de signalisation lumineuse (10) comprenant une chemise tubulaire extérieure (11), un support de tige (15) à plusieurs étages (15.1. 15.2, 15.3) extensible/rétractable de manière télescopique,

où un premier desdits étages télescopiques extensibles/rétractables comprend:

- une première vis-mère (13),
- une première noix (14, 14.1) engagée dans un accouplement hélicoïdal avec ladite vis-mère (13),
- une première section tubulaire télescopique correspondante (15.1) coaxiale et connectée, par des moyens de support respectifs, par rapport à ladite première noix (14) et qui translate, dans la direction axiale, de manière solidaire avec ladite noix (14), lorsque ladite vis-mère est mise en rotation, tandis qu'elle est empêchée de tourner avec ladite noix par des moyens de guidage linéaire ;

où un deuxième desdits étages télescopiques extensibles/rétractables comprend :

- une deuxième vis-mère (17),
- une deuxième noix (18) engagée dans un accouplement hélicoïdal avec ladite vis-mère (17),
- une deuxième section tubulaire télescopique correspondante (15.2) coaxiale et connectée, par des moyens de support respectifs, par rapport à ladite deuxième noix (18),

où la deuxième section tubulaire télescopique (15.2) se déplace dans la direction axiale, de manière solidaire avec ladite deuxième noix (18), lorsque ladite seconde vis-mère (17) est mise en rotation, tandis qu'elle est empêchée de tourner avec la deuxième noix par des moyens de guidage linéaire ;
où ladite première vis-mère (13) dérive son mouvement de moyens à motoréducteur électrique à l'aide de moyens de transmission (12, 12.1) reliés cinématiquement à ladite première vis-mère (13), et
où lesdites première (13) et deuxième (17) vis-mères sont tubulaires, coaxiales et possèdent un filetage extérieur,
où le dispositif de signalisation lumineuse (10) comprend également :

- des premiers moyens à douille (14.2) supportés de manière fixe par ladite première noix (14, 14.1),
- des premiers moyens de support intermédiaires à roulement (17.2) supportés dans une disposition coaxiale par lesdits premiers moyens à douille (14.2), et
- des deuxièmes moyens à douille (17.1) supportés dans une disposition coaxiale par lesdits premiers moyens de support intermédiaire à roulement (17.2), où lesdits deuxièmes moyens à douille (17.1) sont solidaires en rotation par rapport à ladite première vis-mère (13) à l'aide d'une clavette (17.3), la surface extérieure de la première vis-mère (13) comprenant une rainure qui s'étend sa longueur où ladite clavette (17.3) fait saillie,
où une extrémité axiale inférieure de ladite deuxième vis-mère (17) est fixée dans lesdits deuxièmes moyens à douille (17.1), externe et coaxiale par rapport à ladite première vis-mère (13).

2. Dispositif de signalisation lumineuse (10) selon la revendication 1,

où
un troisième desdits étages télescopiques extensibles/rétractables (15.3) comprend :

- une troisième vis-mère (20),
- une troisième noix (21) engagée dans un accouplement hélicoïdal avec ladite troisième vis-mère (20),
- une troisième section tubulaire télescopique correspondante (15.3) coaxiale et connectée, par des moyens de support respectifs, par rapport à ladite troisième vis-mère (21), où la troisième section tubulaire télescopique (15.3) se déplace dans la direction axiale, de manière solidaire avec ladite troisième noix (21), lorsque ladite troisième vis-mère (20) est mise en rotation, où la troisième section tubulaire télescopique (15.3) et la troisième noix (21) sont empêchées de tourner par des moyens de guidage linéaire ;
- des troisièmes moyens à douille (18.2) supportés de manière fixe par ladite deuxième noix (18), des deuxièmes moyens de support intermédiaires à roulement (20.2) supportés dans une disposition coaxiale par lesdits troisièmes moyens à douille (18.2),
- des quatrièmes moyens à douille (20.1) supportés dans une disposition coaxiale par lesdits deuxièmes moyens de support intermédiaire à roulement (20.2), où lesdits quatrièmes moyens à douille (20.1) sont solidaires en rotation par rapport à ladite deuxième vis-mère (17) à l'aide d'une clavette (20.3), la surface extérieure de la deuxième vis-mère (17) comprenant une rainure qui s'étend sa longueur où ladite clavette (20.3) fait saillie, et
- où ladite troisième vis-mère (20) est tubulaire et possède un filetage extérieur, où une extrémité axiale inférieure de ladite troisième vis-mère (20) est fixée dans lesdits quatrièmes moyens à douille (20.1), externe et coaxiale par rapport à ladite deuxième vis-mère (17) et engagée dans un accouplement hélicoïdal avec ladite troisième noix (21).

3. Dispositif de signalisation lumineuse (10) selon la revendication 1, où lesdits moyens linéaires de guidage (16, 19, 22; 16.1, 19.1; 16.2, 19.2, 22.2) comprennent des bagues de guidage (16, 19, 22) fixées de manière coaxiale sur la surface externe d'une section tubulaire télescopique correspondante (15.1, 15.2, 15.3) et qui présente des rainures extérieures (16.1, 19.1) axiales alignées entre elles et engagées avec des moyens de guidage linéaire axial correspondants (16.2, 19.2, 22.2) fixés sur la surface interne de ladite chemise (11), respectivement de la section tubulaire télescopique (15.1, 15.2) adjacente.

4. Dispositif de signalisation lumineuse (10) selon une ou plusieurs des revendications de 2 à 3, où :

- ladite chemise tubulaire extérieure (11) possède à son sommet un couvercle annulaire (11.4), à travers lequel est guidée, à l'aide de moyens d'étanchéité annulaires correspondants, l'extrémité supérieure libre de ladite première section télescopique (15.1) ;

- ladite première section télescopique (15.1) possède à son sommet un couvercle annulaire (15.11), à travers lequel est guidée, à l'aide de moyens d'étanchéité annulaires correspondants, l'extrémité supérieure libre de ladite deuxième section télescopique (15.2) ;
- ladite deuxième section télescopique (15.2) possède à son sommet un couvercle annulaire (15.21), à travers lequel est guidée, à l'aide de moyens d'étanchéité annulaires correspondants, l'extrémité supérieure libre de ladite troisième section télescopique (15.3) ;
- un couvercle annulaire (15.30) ferme partiellement le sommet libre de ladite troisième section télescopique (15.3) et présente un trou axial traversant (15.31) aligné avec les cavités axiales desdites vis-mères (13, 17, 20),

et où ledit dispositif (10) comprend une voie de passage axiale libre, prévue à travers lesdites vis-mère (13, 17, 20), lesdites sections tubulaires télescopiques (15.1, 15.2, 15.3) et ledit trou axial (15.31) du couvercle (15.30), pour des câbles électriques, se ramifiant vers le moyen de signalisation lumineuse et ses moyens de circuit électrique d'alimentation et de commande.

5. Dispositif de signalisation lumineuse (10) selon la revendication 4, où ladite première section télescopique (15.1) possède, à proximité de l'extrémité supérieure, une bride extérieure (15.10).

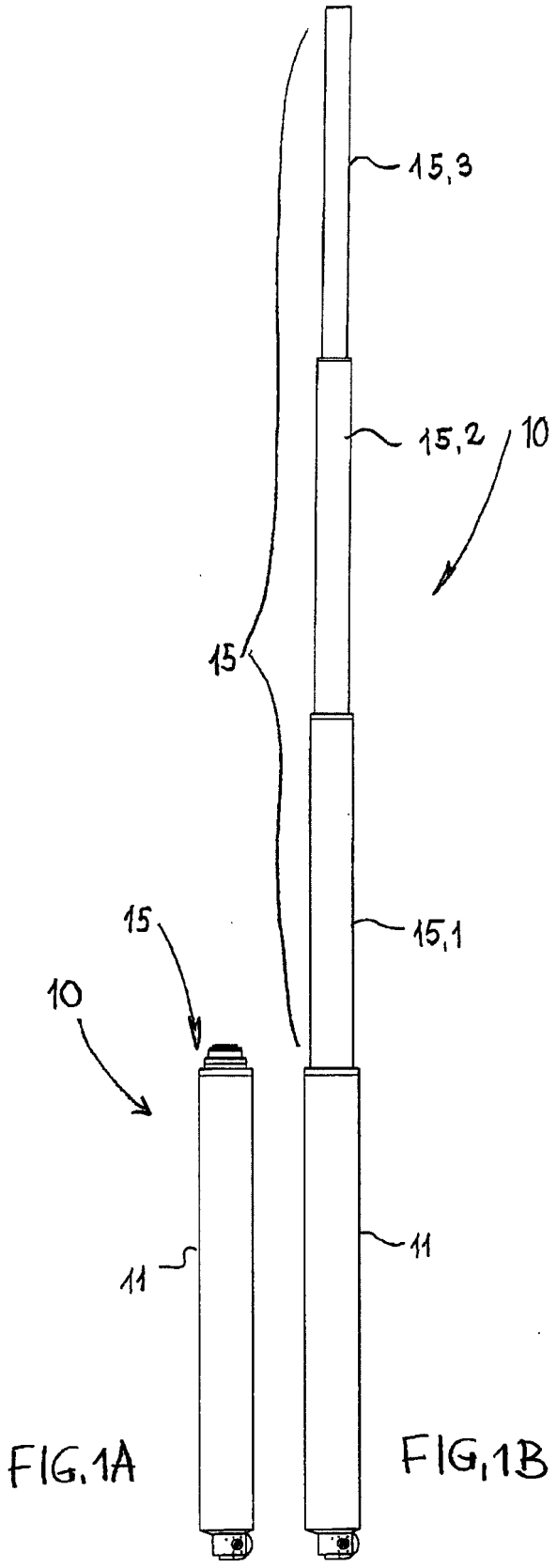


FIG.1A FIG.1B

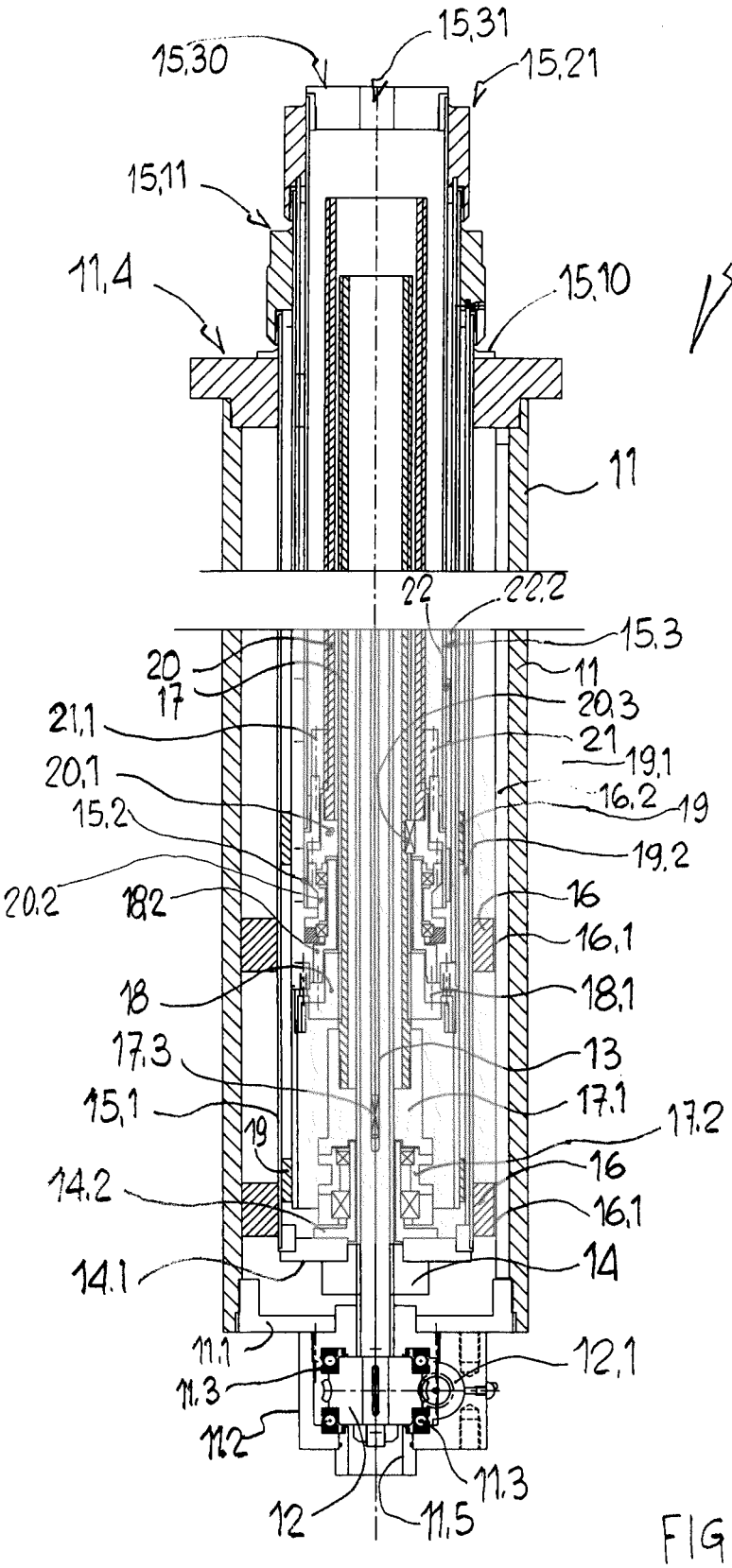

15,31
15,30
15,21
10
15,11
11,4
15,10
11
22
22,2
15,3
20
17
11
20,3
21,1
21
19,1
20,1
16,2
19
15,2
19,2
20,2
18,2
16
16,1
18
18,1
17,3
13
15,1
17,1
17,2
19
16
14,2
16,1
14,1
14
11,1
12,1
11,3
11,2
11,3
12
11,5

FIG.2

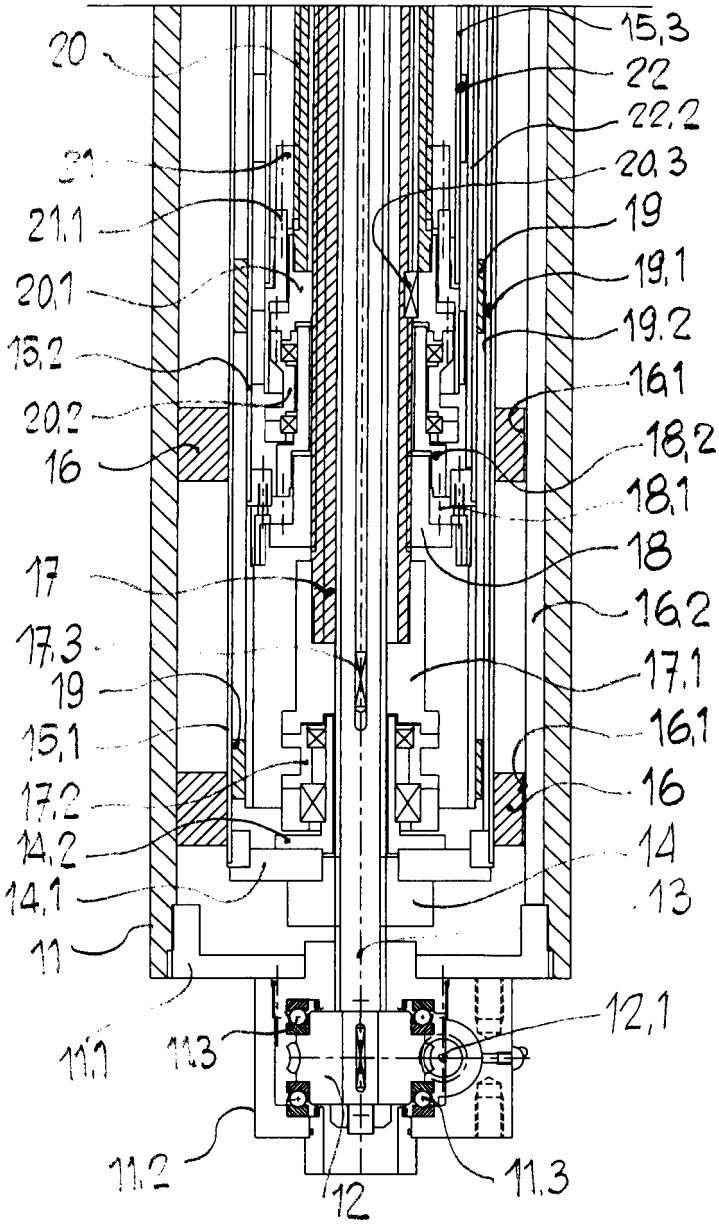

20
21
21.1
20.1
15.2
20.2
16
17
17.3
19
15.1
17.2
14.2
14.1
11
11.1
11.3
11.2
12
15.3
22
22.2
20.3
19
19.1
19.2
16.1
18.2
18.1
18
16.2
17.1
16.1
16
14
13
12.1
11.3

FIG. 3

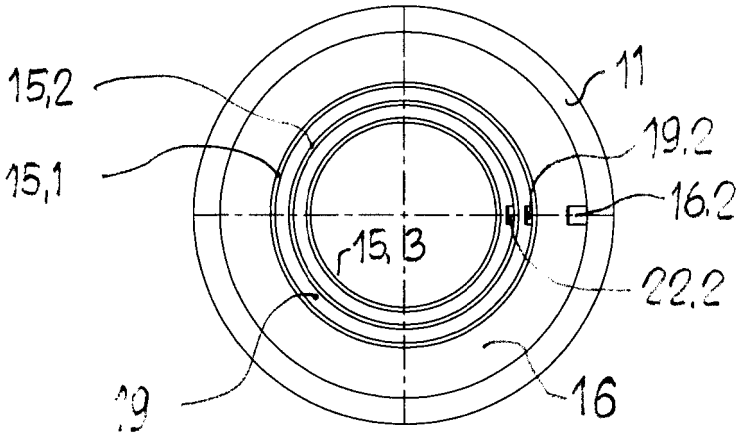
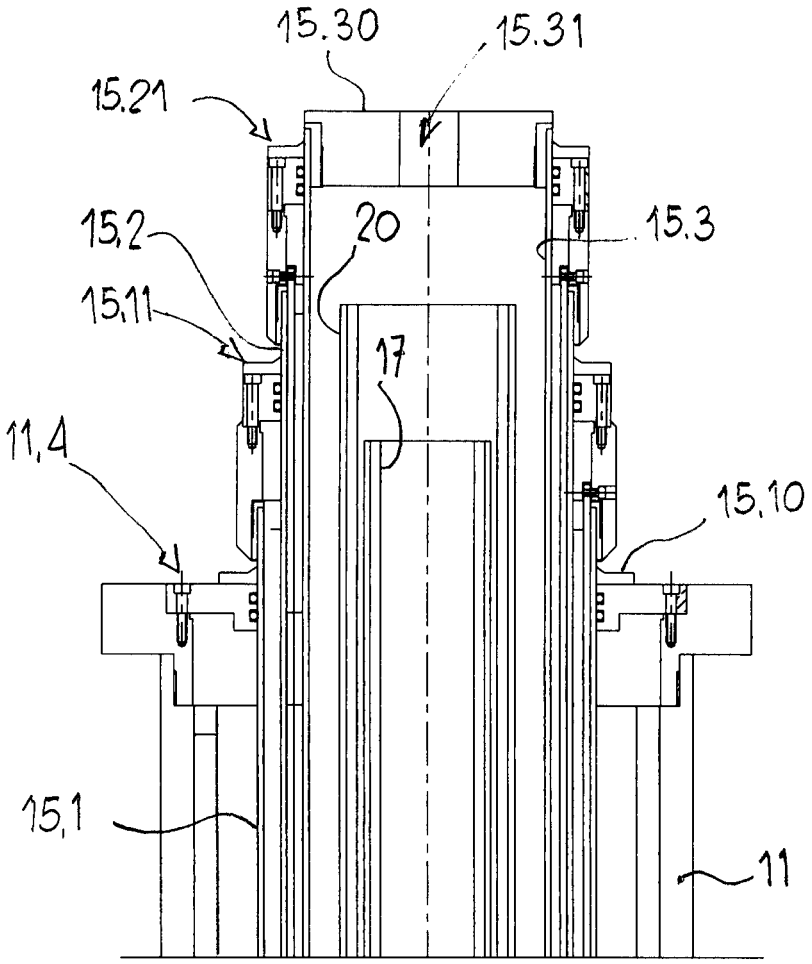

15,2
15,1
19
11
19.2
16.2
22.2
16
15,3

FIG. 4

Fig. 5



REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- DE 202011050508 U1 **[0005]**
- US 2013039081 A1 **[0005]**