

12

EUROPEAN PATENT APPLICATION

21 Application number: 86830009.6

51 Int. Cl.⁴: **B 63 B 15/00**

22 Date of filing: 17.01.86

30 Priority: 31.01.85 IT 2065985 U

43 Date of publication of application:
13.08.86 Bulletin 86/33

84 Designated Contracting States:
AT BE CH DE FR GB LI NL SE

71 Applicant: Scaglia, Enzo
Via Monterosa 21
I-20149 Milan(IT)

72 Inventor: Scaglia, Enzo
Via Monterosa 21
I-20149 Milan(IT)

74 Representative: Calvani, Domenico
UFFICIO BREVETTI ING. CALVANI, SALVI & VERONELLI
4, Piazza Duca d'Aosta
I-20124 Milan(IT)

54 A device for removably connecting hollow cylindrical elements in masts for sailing transport means.

57 The device for the removable connection of two hollow cylindrical elements (22, 24) of masts (10) for sailing transport means comprises at least an O-ring (40) of elastic material movable on the surface of one (22) of the hollow cylindrical elements (22, 24) facing the other (24) of the hollow cylindrical elements (22, 24) from a first steady position in which the hollow cylindrical elements (22, 24) are unlocked, through an instability area (34-38), to a second steady position in which the hollow cylindrical elements (22, 24) are locked to each other by squeezing of the O-ring (40) therebetween, said movement of the O-ring (40) being determined by the dragging action of the other (24) of the hollow cylindrical elements (22, 24) during the axial insertion and extraction movements of the hollow cylindrical elements (22, 24).

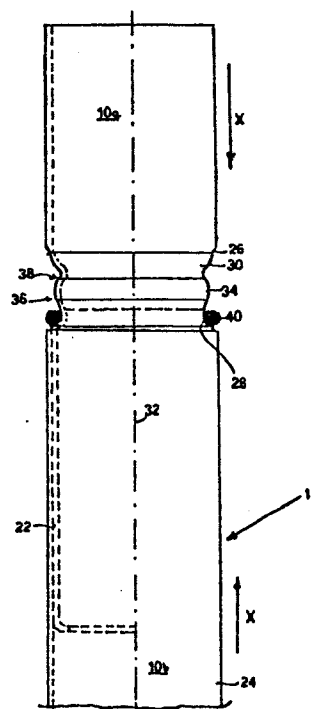


Fig. 3

A DEVICE FOR REMOVABLY CONNECTING HOLLOW CYLINDRICAL
ELEMENTS IN MASTS FOR SAILING TRANSPORT MEANS

DESCRIPTION

The present invention relates to a device for removably connecting two coaxial hollow cylindrical male and female elements, respectively, which can be telescoped into each other for a predetermined length and belong to two mast sections or to a mast top and to a mast heel or to a mast cap in masts for transport means, particularly light sailing boats, such as boarders, wind-surfs and the like.

The light boats and transport means of the above-defined kind, particularly the so-called wind-surfs, are provided with a mast generally formed of an aluminium tube having a length of 4,40 4,60 meters, which is intended to be removably secured to the hull by means of an articulated joint and to be closed at the upper end by a "cap" which retains the sail in position. These so long masts present problems of transport either on vehicle roofs or in airplanes, as well as storage problems and it would be therefore advisable for them to be severed in at least two coaxial elements.

However, this severing involves the need of providing a connecting device which can be quickly and readily locked and unlocked and assures at the same time a perfect retention of the strength characteristics of an integral mast, and this under the operative and environmental conditions in which the transport means of concern are. This device, under the above-mentioned conditions, could be applied also in the case of the removable fastening of the mast heel to the articulated joint as well as the cap to be mast head. Particularly in the case of multiple use it is advisable that the above-mentioned connecting devices are in a position to impart to the mast a good hermetic seal not only with respect to the solid matters which can

penetrate it but also, in the case of boats, with respect to the water which would unduly make heavy the mast when it is hoisted from the liquid surface to the operative position on the wind-surf.

In accordance with the invention and in order to achieve the above-mentioned advantageous characteristics, there is provided a removably connecting device for the particularities and applications mentioned in the introductory part of the description, which device is essentially characterized in that it comprises at least a packing means movable on the surface of one of the two substantially hollow cylindrical elements facing the other of the two substantially hollow cylindrical elements from a first steady position in which said substantially hollow cylindrical elements are unlocked, through an instability area to a second steady position in which said substantially hollow cylindrical elements are locked to each other by squeezing of said packing means therebetween, said movement being determined by the dragging action of the other of said substantially cylindrical elements in the axial insertion and extraction movements thereof.

In particular, said packing means is a so-called O-ring having a toroidal shape circular in cross-section and of elastic material assuring a substantial water seal to the joint, although this joint is made by hand in a very simple manner, by axial forced insertion movement of the two elements.

This insertion movement causes a rolling movement of the packing means on itself, with displacement from the first to the second positions both defined by circumferential seats provided on one of the facing surfaces of the substantially hollow cylindrical elements to be coupled. In the second position the O-ring is elastically deformed and locks thereby the two hollow cylindrical element, by exerting the necessary sealing action and imparting the desired strength characteristic to the connection.

These and other features of the invention will be now described in connection with an embodiment thereof, illustrated in the accompanying drawings.

Figs.1 and 2 show in a different scale a front view partially broken away of a mast for light sailing transport means, formed according to the invention;

Figs.3 and 4 show a side view of the connecting device in an unlocked and a locked condition of its components, respectively.

As already said, this invention finds a particular even if not exclusive application in light sailing transport means, which are movable on sand, land, ice, water or the like. In particular, the application that at present is considered of most interest is in masts of the light boats

such as boarders, wind-surfs and the like, which masts have often a not excessive length in order to permit an easy transport and storage thereof and which, for example in the case of wind-surfs, are removably connected at one end to an articulated joint secured to the body and at the opposite end are provided with a closure element, called "cap", which cooperates in retaining in position the sail threaded on the mast. Both to avoid the penetration of foreign matters which can damage the mast and to prevent the penetration of water which would make the lifting operation of the mast during sailing very hard, it is advisable to provide hermetically sealed connections. In particular, the mast 10, for example made of aluminium, is formed of two coaxial hollow slightly frusto-conical cylindrical elements 10a, 10b or ^{of} any other geometrical shape, which are locked to each other by an intermediate connecting device 12. Such a connecting device 12a is provided at the mast heel, between the lower end thereof and a male support 14 pivotally connected through a buffer 16 to the wind-surf body, indicated at 18. Also the upper portion 10a of mast terminates with a so-called "cap" 20 inserted into the free upper end of the mast and locked thereto by means of a connecting device 12b according to the invention.

The above-mentioned connecting device 12 will be now described in more detail in the Figs. 3 and 4, wherein such device is shown applied to the removable connection between two elements 10a and 10b of the mast 10. The connection device comprises two male and female coaxial hollow cylindri-

cal portions 22 and 24 which are so dimensioned that the male portion 22 can penetrate the female portion 24 for a sufficient length to assure a desired strength of the assembly, the penetration degree being determined by an abutment 26 provided on the mast element carrying the male portion, against which the free end of the female portion 24 abuts.

The end zone of the male hollow cylindrical portion 22 is shaped as shown in the Figures, for example by a local deformation operation of the surface, such as rolling or the like, so as to form two circumferential seats 28 and 30 being axially spaced from each other and having a different depth. More particularly, the seat 28 is formed by a groove the bottom of which is closer to the axis 32 of the hollow cylindrical portions than the bottom of the groove forming the seat 30. Furthermore, both seats 28, 30 are connected to each other by a shaped section outwardly projecting from the bottom of the seats with respect to the axis 32.

More particularly, this shaped section as a substantially cylindrical top wall 34 and two side wall 36, 38 inclined towards the seats 28 and 30, respectively. The wall 36 inclined towards the seat 28 has a lower slope than that of the wall 38 inclined towards the seat 30.

In these seats and therebetween a movable packing means is placed, which is formed of a toroidal elastic element 40, circular in cross-section (O-ring) and which in the unlocked condition of the two hollow cylindrical portions 22, 24, lies within the seat 28 facing the female portion 24. By pushing this female portion 24, starting

from the position of Fig. 3 in the direction of the arrows X indicated in this Figure, relative to the male portion 22 a rolling movement of the O-ring 40 above the shaped section 34-38 occurs until the O-ring enters the seat 30, which movement occurs together with that of insertion of the two portions 22, 24, until the position indicated in Fig. 4 is reached, wherein the portion 24 is against the abutment 26. In this condition, the connection is operative and the two portions 22, 24 are locked to each other and axially retained, in a sufficient manner for the application of the invention, by the friction exerted by the O-ring 40 within the seat 30, where it is squeezed, and by the ramp formed by the wall 38.

To unlock the connection it will be sufficient to exert an axial force in the direction of the arrows Y in Fig. 4 on the portions 22, 24 to cause a rolling movement of the O-ring 40 until it will be against into the seat 28, thereby unlocking the two mast elements.

It is to be noted that; while the seats 28, 30 and the shaped section 34-38 have been illustrated as formed on the male portion 22, the device can operate as well if the shaped section and the seats are provided on the female portion 24, while the male portion is provided with a smooth surface.

C L A I M S

1. A device for removably connecting two coaxial male and female elements (22,24) which can be telescoped into each other for a predetermined length and belong to two mast sections/or to a mast head and to a mast heel or to a mast cap in masts for transport means, particularly light sailing boats, such as boarders, wind-surfs and the like, characterized in that it comprises at least a packing means (40) movable on the surface of one (22) of the two substantially hollow cylindrical elements (22,24) facing the other (24) of the two substantially hollow cylindrical elements (22,24) from a first steady position in which said substantially hollow cylindrical elements (22,24) are unlocked, through an instability area (34-38) to a second steady position in which said substantially hollow cylindrical elements (22,24) are locked to each other by squeezing of said packing means (40) therebetween, said movement being determined by the dragging action of the other (24) of said substantially cylindrical elements (22,24) in the axial insertion and extraction movements thereof.

2. A device according to claim 1, characterized in that said packing means (40) is made of an elastic material and has a toroidal configuration, preferably circular in cross-section (O-ring).

3. A device according to claim 1, characterized in that said steady positions are defined by seats (28,30) provided on the surface of one (22) of the substantially hollow cylindrical elements (22,24), connected to each other by a shaped section (34-38) slightly projecting from said seats (28,30).

4. A device according to claim 3, characterized in that said shaped section (34-38) between said seats (28,30) includes a substantially cylindrical top wall (34), as well as side walls (36,38) inclined towards said seats (28,30).

5. A device according to claim 4, characterized in that the slope of the wall (36) directed towards the seat (28) corresponding to the unlocked position of said substantially hollow cylindrical elements (22,24) is less inclined than that of the wall (38) directed towards the seat (30) corresponding to the locked position of said elements.

6. A device according to claim 3, characterized in that said seats (28,30) and the shaped section (34-38) therebetween are provided by local deformation of the outer surface of the male element (22), while the female element (24) has a substantially smooth inner surface.

7. A device according to claim 3, characterized in that said seats (28, 30) and the shaped section (34-38) therebtetween are provided by local deformation of the inner surface of the female element (24), while the male element (22) has a substantially smooth outer surface.

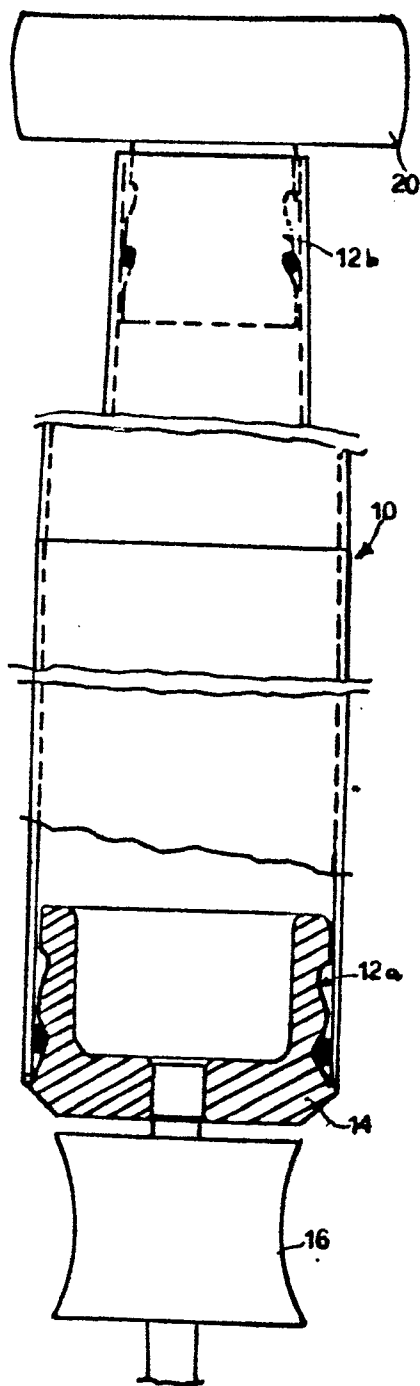


Fig. 2

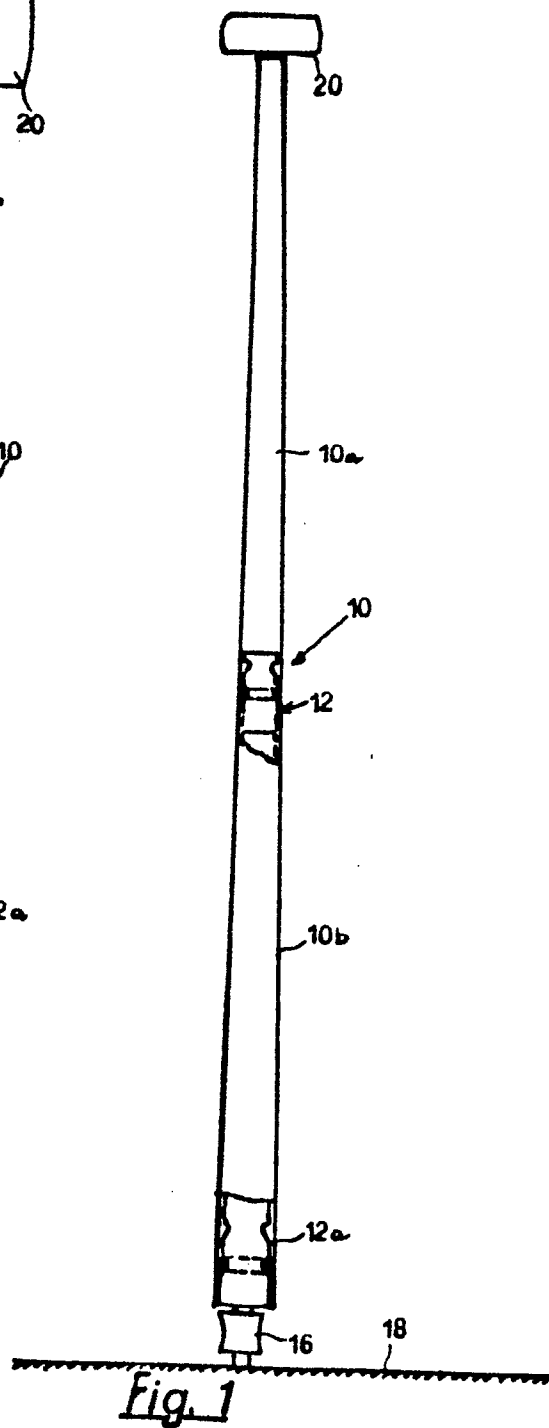


Fig. 1

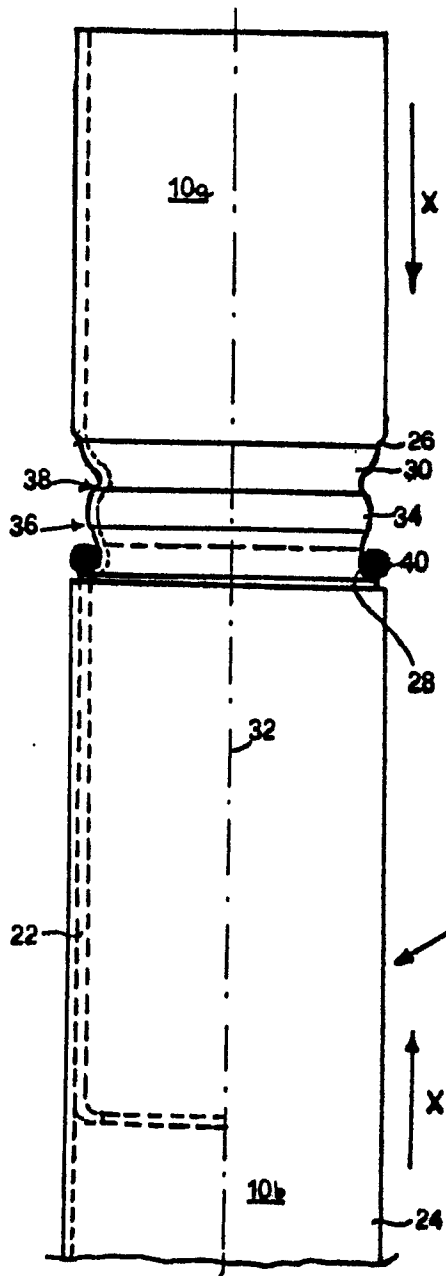


Fig. 3

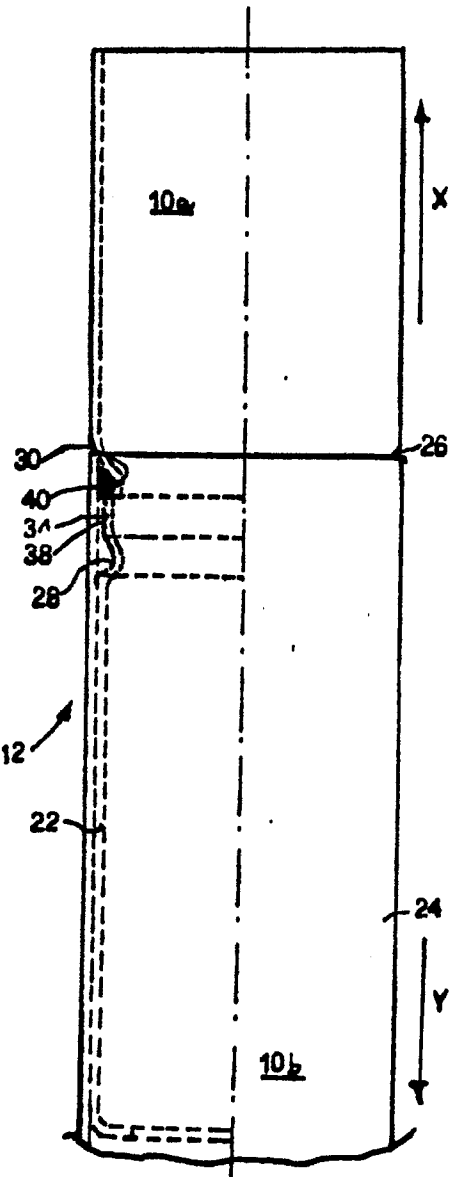


Fig. 4



European Patent
Office

EUROPEAN SEARCH REPORT

0191001

Application number

EP 86 83 0009

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 4)
X	FR-A-2 446 401 (LOSSERAND) * Whole document *	1-4	B 63 B 15/00
A	EP-A-0 070 241 (MORISSEAU) ----- -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl. 4)
			B 63 B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 09-05-1986	Examiner KNOPS J.
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	