

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization

International Bureau



(10) International Publication Number

WO 2013/026955 A1

(43) International Publication Date
28 February 2013 (28.02.2013)

WIPO | PCT

(51) International Patent Classification:

F16B 7/14 (2006.01) D07B 7/10 (2006.01)
B65H 54/02 (2006.01)

(21) International Application Number:

PCT/FI2012/050782

(22) International Filing Date:

13 August 2012 (13.08.2012)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

20115809 19 August 2011 (19.08.2011) FI

(71) Applicant (for all designated States except US):
MAILLEFER S.A. [CH/CH]; Route du Bois 37, CH-1024 Ecublens (CH).

(72) Inventor; and

(75) Inventor/Applicant (for US only): MÄKELÄ, Kari [FI/FI]; c/o Maillefer S.A., Route du Bois 37, CH-1024 Ecublens (CH).

(74) Agent: KOLSTER OY AB; Iso Roobertinkatu 23, P.O.Box 148, FI-00121 Helsinki (FI).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,

BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

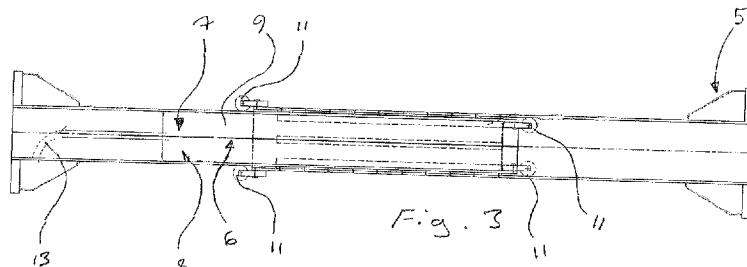
Declarations under Rule 4.17:

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))
- of inventorship (Rule 4.17(iv))

Published:

- with international search report (Art. 21(3))

(54) Title: SPOOLING MACHINE



(57) Abstract: The invention relates to Spooling machine comprising two side frames (1) spaced at a horizontal distance by a telescopic spacer beam (2), each frame (1) having a pintle on supports forbearing a drum for cable pipe or hose, the telescopic spacer beam (2) comprising at least one outer tube (3) and at least one inner tube (4), which are slidably and telescopically one inside the other and a locking device positioned between the outer tube (3) and the inner tube (4) for locking the outer and inner tube in adjustable position. The locking device comprises a split part (6) of the inner tube (4) extending over a part of the length of the inner tube and dividing the inner tube into sections (7,8), and a force element (9) for creating a swelling force on the split part (6) of the inner tube to press the sections (7,8) against the inner surface of the outer tube (3).

WO 2013/026955 A1

Spooling machine

The invention relates to a spooling machine comprising two side frames spaced at a horizontal distance by a telescopic spacer beam, each 5 frame having a pintle on supports for bearing a drum for cable pipe or hose, the telescopic spacer beam comprising at least one outer tube and at least one inner tube, which are slidably and telescopically one inside the other and a locking device positioned between the outer tube and the inner tube for locking the outer and inner tube in adjustable position.

10 As described above the invention relates to floor reeling devices, i.e. a pay-off devices or a take-up devices widely used for example in manufacturing electrical wires and cables, i.e. in various fields of cable manufacturing industry.

15 Reeling devices or spooling machines consist typically of two side frames spaced at a horizontal distance by a telescopic spacer beam. Each frame has a pintle on vertically movable supports. The supports support and bear the drum onto which a cable, pipe or hose is paid off or taken up.

20 Fastening of the reel or dismounting of the reel to the floor necessitates changing the side frame parts distance to release the pintles and therefore an adjustable spacer mechanism is needed. Width adjustment is also necessary to adapt for different drum widths. The spacer mechanism must also provide for backlash-free operation in order to ensure precise, safe and repeatable pickup and release of the reel.

25 In the field there are several constructions designed to meet the demands described above. A typical known structure uses frame distance adjustment achieved by means of a telescopic spacer structure in which a bar is made of a cylindrical rod sliding in a bushing similar to hydraulic cylinders. The precision fit of rod and bushing requires expensive precision manufacturing which means that the constructions used in the prior art rise the costs 30 of for example cable manufacturing process.

As an example of typical prior art constructions a mechanism described in U.S. Patent Application Publication No. 2008/0315058 A1 can be mentioned. The construction shown in said publication has the disadvantages of the prior art described above.

35 The object of the invention is to obtain an arrangement by which the disadvantages of the prior art can be eliminated. This is achieved with the

present invention. The present invention is characterized in that the locking device comprises a split part of the inner tube extending over a part of the length of the inner tube and dividing the inner tube into sections, and a force element for creating a swelling force on the split part of the inner tube to press 5 the sections against the inner surface of the outer tube.

An advantage of the invention is its low manufacturing costs and therefore the use of the invention is very advantageous as a whole, i.e. the invention offers an economical way to obtain adjustable spacing function in connection with a reeling or a spooling machine.

10 The invention will now be explained in closer detail with reference to the embodiments shown in the attached drawing, whereby

Figure 1 shows an example of a spooling machine known in the field,

15 Figure 2 shows a front view of one embodiment of the arrangement of the invention,

Figure 3 shows a top view of the embodiment of Figure 2,

Figure 4 shows a section along the line A – A shown in Figure 2 and Figure 5 is a detail of Figure 4 shown in a larger scale.

20 Figure 1 shows a typical spooling machine of the prior art. The spooling machine shown comprises two side frames 1 spaced at a horizontal distance by a telescopic spacer beam 2. The telescopic spacer beam 2 is in the prior art technique made of a cylindrical rod sliding in a bushing similar to hydraulic cylinders as described earlier. The construction shown is also provided with an appropriate locking device positioned between the outer tube 25 and the inner tube for locking the outer and inner tube in adjustable position. The construction shown has the disadvantages of the prior art described earlier.

30 The construction and the operation principle of the spooling machine described above are quite familiar to a person skilled in the art, and therefore said matters are not described here in detail.

As described above the invention offers an economical way to obtain the adjustable spacing function, i.e. an economical way to eliminate the expensive construction of the adjustable spacer beam used in the prior art.

35 Figures 2 – 5 show one embodiment of the present invention, i.e. one embodiment of the arrangement for a telescopic spacer beam of the invention.

In the embodiment shown in Figures 2 – 5 the spacer beam 2 comprise two square tube sections, i.e. an outer tube 3 and an inner tube 4. Said square tubes are made of commercial steel tubing and said tubes form a telescopic arrangement which can be seen clearly from Figures 2 and 3.

5 The outer tube 3 is a solid tube with for example a suitable flange 5 for attachment to the side frame 1 of a reeling device. The inner tube is also provided with an appropriate flange for attachment to the side frame as shown in the Figures.

10 The inner tube 4 has a smaller section than the outer tube 3 such that the inner tube 4 can be fitted inside the outer tube 3 with some clearance to form a telescopic structure as shown in Figures 2 and 3.

15 An important feature of the invention is that the locking device comprises a split part 6 of the inner tube 4. Said split part 6 extends over a part of the length of the inner tube as shown in Figure 3. Said split part 6 divides the inner tube 4 into sections 7, 8.

The locking device comprises further a force element 9 for creating a swelling force on the split part 6 of the inner tube 4 to press the sections 7, 8 against the inner surface of the outer tube 3.

20 As described above the inner tube 4 has been split in a certain way. In the embodiment shown the inner tube 4 has been split in the vertical axis into two sections 7, 8. This however not the only possibility but also three, four or even more split sections can be used.

25 The embodiment shown in Figures 2 – 5 uses square tubes as the outer tube 3 and the inner tube 4. The invention is not however restricted into square tubes but other tube shapes can be used too, as an example a hexagonal form can be used etc.

30 In the embodiment of the Figures the force element 9 comprises an inflatable bag element or an inflatable hose element. The invention is however not restricted a certain type of force element, i.e. it is also possible to use for example hydraulic or electrical cylinder or a wedge element as a force element 9.

35 The embodiment shown comprises advantageously also flat bars 10 fixed on the inside of the outer tube 3 to provide a vertical guiding of the inner tube 4 in the outer tube 3. There may also advantageously be guide rolls 11 mounted to outer tube 3 and the inner tube 4 to provide lateral guiding. The guide rolls 11 are preferably spring-loaded guide rolls.

The embodiment may further comprise bars 12 extending over at least a part of the inner tube 4. Said bars 12 are fitted in the inside corners of the outer tube 3. Said bars 12 are preferably half square bars but it should be noted that appropriate other forms may also be used.

5 When the inflatable or pressurizing bag element 9 is inflated, it exercises a swelling force on the inner tube 4 which will swell with its split part such that the sections 7, 8 are pressed against the bars 12 fitted in the inside corners of the outer tube 3, and thereby fixing or locking the inner tube 4 respective to the outer tube 3. The inflatable bag element 9 may be inflated 10 through an appropriate element for example through a pipe 13.

When the inflatable or pressurizing element 9 is deflated, the swelling force disappears and the inner tube 4 is released with respect to the outer tube 3 so that telescopic movement of the inner tube and the outer tube is enabled.

15 In this connection it must be noted that the operation of the invention has been described above with an embodiment using an inflatable bag element as a force element 9. This is however not the only possibility but other force elements creating said swelling force can also be used.

20 The invention has been described above with an embodiment using two interacting tubes. The invention is not restricted to that but it is quite possible in the invention to use also for example three or even more interacting tubes.

25 As described above the invention, i.e. its structure and operation has been clarified by reference to an embodiment shown in the Figures. The invention is however not restricted to the embodiment shown. The invention, i.e. different structural details, dimensions and features may vary freely within the claims enclosed.

Claims

1. Spooling machine comprising two side frames (1) spaced at a horizontal distance by a telescopic spacer beam (2), each frame (1) having a pintle on supports for bearing a drum for cable pipe or hose, the telescopic spacer beam (2) comprising at least one outer tube (3) and at least one inner tube (4), which are slidably and telescopically one inside the other and a locking device positioned between the outer tube (3) and the inner tube (4) for locking the outer and inner tube in adjustable position, characterized in that the locking device comprises a split part (6) of the inner tube (4) extending over a part of the length of the inner tube and dividing the inner tube into sections (7, 8), and a force element (9) for creating a swelling force on the split part (6) of the inner tube to press the sections (7, 8) against the inner surface of the outer tube (3).
5
2. Spooling machine as claimed in claim 1, characterized in that the outer tube (3) and the inner tube (4) are square tubes.
15
3. Spooling machine as claimed in claims 1 or 2, characterized in that the inner tube (3) has been split (6) in the vertical axis into two sections.
20
4. Spooling machine as claimed in any of the claims 1 – 3, characterized in that the force element (9) comprises inflatable bag element, hydraulic or electric cylinders or a wedge mechanism.
25
5. Spooling machine as claimed in any of the claims 1 – 4, characterized by guide rolls (11) to provide lateral guiding of the inner and outer tubes.
30
6. Spooling machine as claimed in any of the claims 1 – 5, characterized by flat bars (10) on the inside of the outer tube to provide vertical guiding of the inner tube in the outer tube.
35
7. Spooling machine as claimed in any of the claims 1 – 6, characterized by bars (12) extending over at least a part of the inner tube (4), the bars being fitted in the inside corners of the outer tube (3).
40
8. Spooling machine as claimed in claim 7, characterized in that the bars (12) are half square bars.
45

1/1

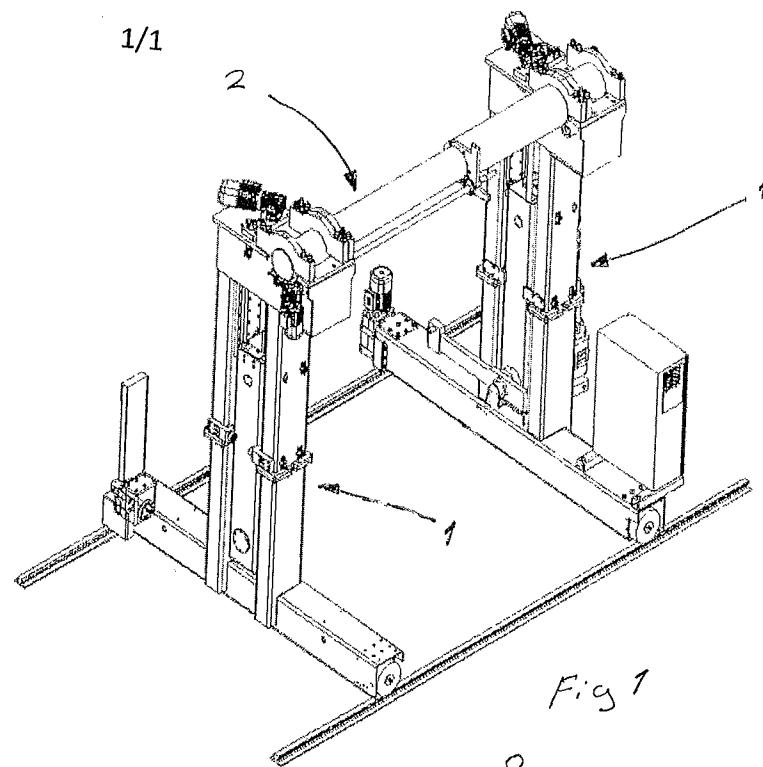


Fig. 1

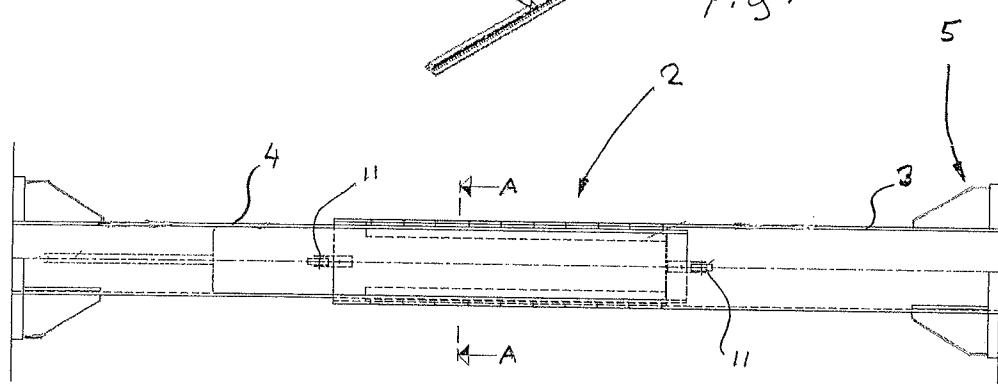


Fig. 2

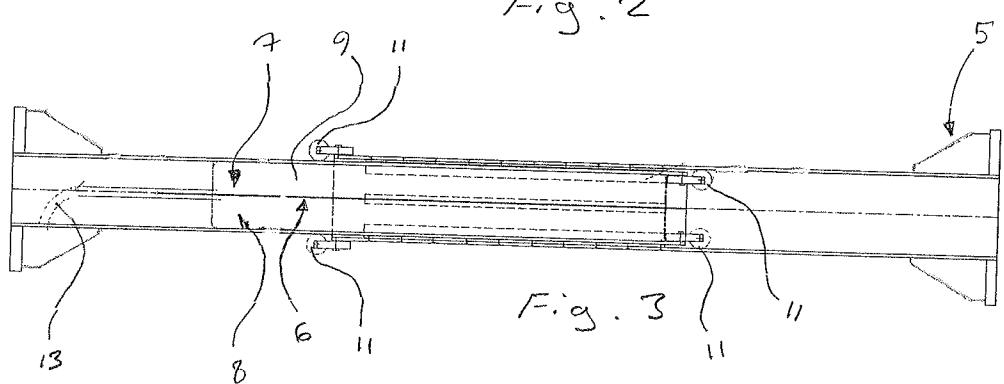


Fig. 3

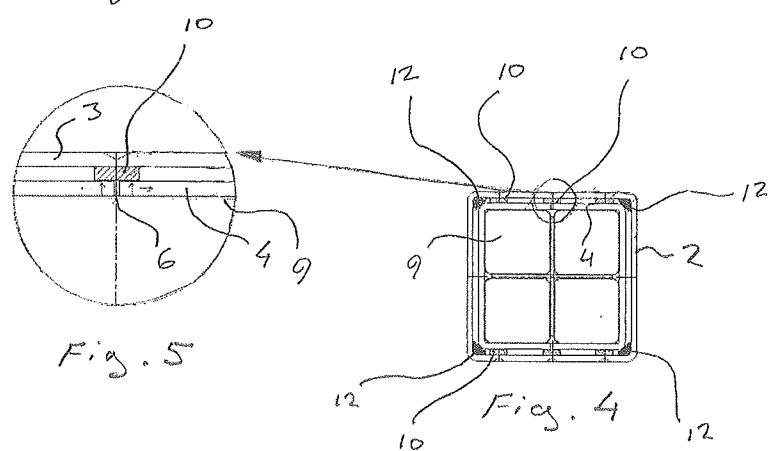


Fig. 5

Fig. 4

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI2012/050782

A. CLASSIFICATION OF SUBJECT MATTER

See extra sheet

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: F16B, B65H, D07B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
FI, SE, NO, DK

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5320295 A (JAASKELAINEEN VESA et al.) 14 June 1994 (14.06.1994) abstract; col. 1, lines 5-44; col. 2, l. 46-55; fig. 1	1-8
Y	US 4679743 A (DALLMAIER GUNTER) 14 July 1987 (14.07.1987) abstract; col. 2, l. 64 - col. 3, l. 25; fig. 1	1-8
Y	JP 58034998U U (not known) 07 March 1983 (07.03.1983) fig. 1, 2, 4	1-8
Y	US 3098669 A (PHILIPPE FORTIN LOUIS et al.) 23 July 1963 (23.07.1963) col. 1, l. 10-15; col. 2, l. 8-30, 52-59; claims; fig. 1-6	1-8
Y	US 4619548 A (KAZAOKA KENICHI et al.) 28 October 1986 (28.10.1986) col. 1, l. 5-30; col. 2, l. 58 - col. 3, l. 23; col. 5, l. 8-13; claims; fig. 1-4	1-8
Y	US 2816769 A (NOBLE RICHARD M) 17 December 1957 (17.12.1957) col. 1, l. 63 - col. 2, l. 14; claims; fig. 1-3	1-8

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search
22 November 2012 (22.11.2012)Date of mailing of the international search report
23 November 2012 (23.11.2012)Name and mailing address of the ISA/FI
National Board of Patents and Registration of Finland
P.O. Box 1160, FI-00101 HELSINKI, Finland
Facsimile No. +358 9 6939 5328Authorized officer
Rauli Erävalo
Telephone No. +358 9 6939 500

INTERNATIONAL SEARCH REPORT

International application No.

PCT/FI2012/050782

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 52135312U U (not known) 14 October 1977 (14.10.1977) fig. 1-3	1-8
A	US 2008315058 A1 (ZARPELLON STELVIO) 25 December 2008 (25.12.2008) abstract; claims; fig. 1-9	1-8

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/FI2012/050782

Patent document cited in search report	Publication date	Patent family members(s)	Publication date
US 5320295 A	14/06/1994	None	
US 4679743 A	14/07/1987	FI 862027 A JP 62060763 A EP 0202520 A2 AT 39911T T NO 861608 A DE 3517696 A1	18/11/1986 17/03/1987 26/11/1986 15/01/1989 18/11/1986 20/11/1986
JP 58034998U U	07/03/1983	None	
US 3098669 A	23/07/1963	None	
US 4619548 A	28/10/1986	DE 3501132 A1 JP 60188614 A	05/09/1985 26/09/1985
US 2816769 A	17/12/1957	None	
JP 52135312U U	14/10/1977	None	
US 2008315058 A1	25/12/2008	US 2008283713 A1 JP 2009522592 A WO 2007074493 A1 EP 1966532 A1 CN 101351669 A JP 2009522589 A WO 2007073805 A1 EP 1966531 A1 CN 101346576 A AT 428085T T IT PD20050381 A1	20/11/2008 11/06/2009 05/07/2007 10/09/2008 21/01/2009 11/06/2009 05/07/2007 10/09/2008 14/01/2009 15/04/2009 29/06/2007

INTERNATIONAL SEARCH REPORT

International application No.
PCT/FI2012/050782

CLASSIFICATION OF SUBJECT MATTER

Int.Cl.

F16B 7/14 (2006.01)

B65H 54/02 (2006.01)

D07B 7/10 (2006.01)