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(71) Applicant: **Aktsiaselts Flagmore**
75121 Kolu küla (EE)

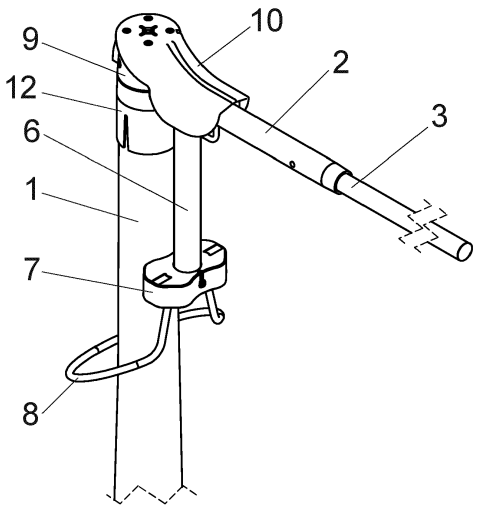
(72) Inventors:
- **Sisas, Rivo**
  75121 Kolu küla (EE)
- **Pae, Tõnis**
  75121 Kolu küla (EE)

(74) Representative: **AAA Patendibüroo OÜ**
Tartu mnt 16
10117 Tallinn (EE)

(54) ROTATING CROSS ARM STRUCTURE FOR A FLAGPOLE WITH AN INTERNAL ROPE SYSTEM

(57) The invention relates to a revolving cross-arm 2 structure hoistable up a flagpole 1 with an internal halyard system. It comprises at a tip of the flagpole 1 a sleeve 12, in the sleeve 12 rotatably placed hollow vertical part 13 of a truck 9, where a flag halyard 14 located in the flagpole 1 is guided through the hollow vertical member 13 and exiting in a lateral direction through the guide groove 15 in the truck 9 from said truck 9. The truck 9 has a laterally projecting holding part 10, which includes a downwardly opened receiving slot 11 for receiving the corner part of the L-shaped cross arm 2. The vertical branch 6 of the cross arm 2 contains compression spring 17. Also, at the end of the vertical branch 6 of the cross arm 2 is a slider 7, to which a retaining loop 8 around the flagpole 1 is attached.

FIG. 3



EP 4 435 767 A1

Description

TECHNICAL FIELD

[0001] The present invention relates to the field of flagpoles. The present invention provides a revolving cross-arm structure hoistable up a flagpole with an internal halyard system, enabling hoisting or lowering and replacing, if necessary, a flag or banner without the flagpole being lowered.

BACKGROUND ART

[0002] As the cross-arm structure of the invention can be used for hoisting a flag as well as a banner, in the following description, the term "banner" is used in the broadest meaning and the term also covers a flag.

[0003] Flags have generally the main part of flag fabric and a bordering seam in the edges. At one edge, at least the near opposite ends of edges, there are generally loops, attachment cords, holes or a sleeve extending along the entire edge for receiving the flagpole or cross-arm.

[0004] Flags are usually hoisted from the side of a flagpole or a structure with approximately 45° angle. In order to hold the flag in a swing position in a lull weather, a cross-arm can be used in the upper edge of the flag. The cross-arm (including its extension) may extend along only a part of the length of the upper edge of the flag or the entire length of the upper edge of the flag.

[0005] At the upper edge of the banner, there are loops, attachment cords, holes or a sleeve extending along the entire edge for receiving the cross-arm (including its extension). Banners are generally hoisted hanging at 90° from the cross-arm.

[0006] Japanese patent application JP2001056655A (published 27.02.2001) discloses a revolving cross-arm structure hoistable up a flagpole with an internal halyard system. There are rings around the flagpole in both ends of the vertical part of the L-shaped cross-arm.

[0007] A halyard runs inside the flagpole to the top of the flagpole and through the revolving truck and down from the extension projecting laterally from the truck, where the end of the halyard is attached near the end of the horizontal part of L-shaped cross-arm. When hoisting the flag / banner, the cross-arm with halyard is pulled against the lower edge of the extension where the halyard exits.

[0008] The drawback of this specific solution is the lack of a system for retaining the tension of the halyard - when the halyard slackens due to fluctuations of temperature and humidity, the cross-arm is not held against the lower edge of the extension of the truck, but it can flap with the flag / banner swinging in the wind, beating the cross-arm against the extension of the truck, which will cause damage to both details in longer perspective. Furthermore, the L-shaped cross-arm can rotate freely in relation to the extension of the truck, causing wear to these contacting details when moving in the wind.

[0009] Such a solution is also not suitable for use in the case of flagpoles with a conical cross section, because the rings located around the pole have more play in the finer upper part of the flagpole and start to beat against the flagpole when the flag swings in the wind.

[0010] A solution closest to the present invention is known from the US patent US6758159B2 (published 06.07.2004), disclosing a revolving cross-arm structure hoistable up a flagpole with an internal halyard system. In this solution, the revolving truck located at the top of the flagpole comprises a lateral horizontal aperture in the lateral surface, which is widening downwards (slot-like), to facilitate the reception of the end of the cross-arm. A roller is located inside the truck opposite to the insert end of said aperture.

[0011] The truck is attached to the top of the flagpole with its hollow vertical member through a sleeve located at the top of the pole, so that the truck can rotate freely around the axis of the flagpole in the sleeve. The halyard runs inside the flagpole through the hollow vertical member of the truck, around the roller and out of the receiving aperture in the truck intended for receiving the end of the cross-arm.

[0012] In a described embodiment of the patent US6758159B2, the hollow cross-arm comprises a compression spring for tensioning the halyard, whereby the end of the halyard is attached to the end of the compression spring with a support washer. When the flag / banner is hoisted, the end of the cross-arm is pulled with the halyard through the flagpole into the receiving end located in the truck, and upon further pulling of the halyard, the compression spring is tensioned so that it holds the halyard under tension and thus, the end of the cross-arm fixed in the truck. The flag / banner attached to the cross-arm forces also the truck to rotate in the wind together with the cross-arm, while retaining the extended position of the flag / banner hung on the cross-arm. A swivel is provided in the halyard inside the flagpole to prevent the twisting of the halyard.

[0013] The drawback of this solution is the fact that in order to hold the cross-arm in a horizontal position together with the hanging flag / banner, the halyard should be tensioned with a relatively high force to overcome the wind and gravity, because due to the configuration of the receiving aperture of the end of the cross-arm, the cross-arm projecting from the truck generates relatively high force lever relative to the part located in its receiving aperture. This causes wear of the bearings of the roller or rollers in the truck as well as an elongation of the halyard.

[0014] Therefore, a thicker and heavier halyard withstanding a higher pulling force should be used to compensate the necessary relatively high tension of the halyard for holding the cross-arm in the truck together with the weight of the flag in a horizontal position even in the case of a relatively strong wind and loads impacting the flag.

[0015] In result, the flagpole itself must be stronger and

more rigid. In addition, in the case of this solution, replacing the halyard is complicated.

SUMMARY OF THE INVENTION

[0016] The present invention provides a revolving cross-arm structure hoistable up a flagpole with an internal halyard system, wherein the above-mentioned drawbacks of the solutions known from prior art are eliminated and which has several other advantages.

[0017] The present invention provides a revolving cross-arm structure hoistable up a flagpole with an internal halyard system, comprising a sleeve at a tip of the flagpole, and in the sleeve, a rotatable hollow vertical member of a truck. A halyard located in the flagpole is guided through the hollow vertical member of the truck and said halyard exits the truck in a lateral direction through the guide groove of the truck.

[0018] The truck has a laterally projecting holding part, which includes a downwardly opened receiving slot for receiving the corner part of the L-shaped cross-arm. The vertical branch of the L-shaped cross-arm contains a compression spring with a halyard inserted into the corner part of the cross-arm and guided through the spring, the end of which is attached to the compression spring so that upon tensioning of the halyard through the flagpole, the corner part of the L-shaped cross-arm is forced into the receiving slot of the holding part.

[0019] At the end of the vertical branch of the L-shaped cross-arm is a slider, to which a retaining loop around the flagpole is attached.

[0020] In a preferred embodiment of the invention, the holding part is a separate detail from the truck, which is attached rigidly onto the truck.

[0021] In a preferred embodiment of the invention, the horizontal branch of the cross-arm is manufactured as a detail in one piece.

[0022] In another preferred embodiment of the invention, the horizontal branch of the cross-arm is adapted for receiving the extension of the cross-arm, i.e. the cross-arm comprises several consecutive parts.

BRIEF DESCRIPTION OF DRAWINGS

[0023] The present invention is described below with reference to the appended schematic drawings, where:

Figure 1 is an axonometric view of the revolving cross-arm of the invention together with a flag / banner hoisted to the flagpole;

Figure 2 is an axonometric view of the revolving cross-arm of the invention in a lowered position without a flag / banner;

Figure 3 is an axonometric detail view of the revolving cross-arm structure hoisted to the flagpole without a flag / banner;

Figure 4 is an axonometric view with dispersed details of the structure depicted on Figure 3;

Figure 5 is a side view of the structure depicted on Figure 3;

Figure 6 is a top view of the structure depicted on Figure 3;

Figure 7 is a longitudinal cross section of the structure depicted on Figure 3;

Figure 8 is a longitudinal cross section of the holding part;

Figure 9 is an end view of the holding part;

Figure 10 is an axonometric top view of the holding part;

Figure 11 is an axonometric bottom view of the holding part;

Figure 12 is an axonometric side view of the main part of the L-shaped cross-arm;

Figure 13 is a cross section of the main part of the L-shaped cross-arm.

DESCRIPTION OF AN EMBODIMENT

[0024] For the sake of clarity of the drawings, the same parts and elements have same reference numbers in different drawings.

[0025] Figure 1 depicts a flagpole 1, with a hoisted flag / banner 4 hanging from the L-shaped cross-arm 2 and its extension 3 at its top, in the lower corner of which a circular weight 5 is attached for holding the edge of the flag facing the flagpole straight. The circular weight 5 can move freely along the flagpole 1.

[0026] At the end of the vertical branch 6 of the cross-arm 2 is a slider 7, to which a retaining loop 8 around the flagpole 1 is attached.

[0027] In the condition shown on Figures 1, 3, 5, and 7, the corner part of the L-shaped cross-arm 2 is fixed in the holding part 10 projecting laterally at the truck 9, which includes a downwardly opened receiving slot 11 for receiving the corner part of the L-shaped cross-arm 2.

[0028] As shown on Figure 7, at a tip of the flagpole 1, there is a sleeve 12, and into the sleeve 12 is placed rotatably a hollow vertical member 13 of a truck 9, whereby a halyard 14 located in the flagpole 1 is guided through the hollow vertical member 13, and exits in a lateral direction through the guide groove 15 in the truck 9 from said truck 9. In the sleeve 12, there is a hollow bush 16 for receiving the hollow vertical member 13 of the truck 9, projecting in longitudinal direction of the flagpole 1 into it.

[0029] The vertical branch 6 of the L-shaped cross-arm 2 contains a compression spring 17 with halyard 14 inserted into the corner part of the cross-arm 2 and guided through said spring, the end of halyard is attached to the compression spring 17 so that upon tensioning of the halyard 14 through the flagpole 1, the corner part of the L-shaped cross-arm 2 is forced into the receiving slot 11 of the holding part 10.

[0030] At the ends of the compression spring 17, there are hollow guide bushes 18 for guiding the position of the halyard in the compression spring 17. At the end of the halyard 14, in the vertical branch 6, there is an end fixture 19 of the halyard in the form of a knot or a special fixing detail, using which the end of the halyard 14 is fixed to the part of the compression spring 17 in the lower guide bush 18, as shown on Figure 7.

[0031] In the embodiment shown in the drawings, the truck 9 is held on the sleeve 12 with the groove 20 (shown on Figure 7) located on the edge of the end of the sleeve, into which groove the projecting part of the truck 9 is hooked (not shown).

[0032] When hoisting the flag 4, the upper edge of the banner is attached to the cross-arm 2 and its extension 3. In the lower corner of the flag / banner 4, e.g., a circular weight 5 is attached; the use of the circular weight 5 is not obligatory but recommended, as it helps to hold the flag / banner 4 (especially when hoisting the banner) in a better position.

[0033] Subsequently, during hoisting, the cross-arm 2 is pulled with the halyard 14 up to the flagpole 1, where the corner part of the cross-arm 2 is pulled into the receiving slot 11 of the holding part 10 with the halyard 14 exiting from the corner part of the cross-arm 2 from the guide bush 18.

[0034] As shown on Figure 7, the halyard 15 runs in the truck 9 over the guide groove 15 located inside, further into the hollow vertical member 13 of the truck 9, and further into the winch or fixture (not shown) of the halyard inside the flagpole 1 at the lower part of the flagpole 1.

[0035] As the weight of the flag 4 is hanging on the horizontal branch of the cross-arm 2 and the extension 3 of the cross-arm at its end, when the corner part of the cross-arm 2 is pulled into the receiving slot 11 of the holding part 10, the vertical branch 6 of the cross-arm 2 is held against the flagpole 1 with the slider 7. The slider 7 together with the retaining loop 8 does not allow the rotation of the cross-arm 2 around the longitudinal axis of the horizontal branch of the cross-arm 2.

[0036] During hoisting, the compression spring 17 in the vertical branch 6 of the cross-arm 2 is pulled under tension, thus compensating for the elongation of the halyard 14, e.g., due to stretching or changes in the moisture content and temperature of the halyard.

[0037] The structure also enables compensating for the elongation or shortening of the halyard due to the twisting of the halyard when the hoisted flag / banner 4 rotates together with the holding part 10 and truck 9 in the sleeve 12.

[0038] Truck 9 is preferably made in several parts, whereby the hollow vertical member 13 of the truck, together with guide groove 15, is in one piece, and around which there is a cover part of the truck 9, which can be split into two halves, and onto which the holding part 10 is attached with screws.

[0039] The cross-arm 2 of the invention is illustrated on Figures 12 and 13 - as shown on the figures, the cross-arm 2 is generally a L-shaped detail, with a horizontal branch, to the end of which the extension 3 of the cross-arm can be attached, if necessary. The lower end of the vertical branch 6 of the cross-arm 2 is in the slider 7, and in the lower part of the branch 6, there are holes into which the ends of the retaining loop 8 are attached through the slider 7.

LIST OF REFERENCE NUMBERS

[0040]

1	flagpole
2	cross-arm
3	extension of cross-arm
4	flag / banner
5	circular weight
6	vertical branch of cross-arm
7	slider
8	retaining loop
9	truck
10	holding part
11	receiving slot
12	sleeve
13	hollow vertical member of truck
14	halyard
15	guide groove
16	bush
17	compression spring
18	guide bush
19	end fixture of halyard
20	groove

Claims

1. A revolving cross-arm (2) structure hoistable up a flagpole (1) with an internal halyard system, comprising a sleeve (12) at a tip of the flagpole (1), and in the sleeve, a rotatably placed hollow vertical member (13) of a truck (9), whereby the halyard (14) located in the flagpole (1) is guided through the hollow vertical member (13) of said truck, and exits in a lateral direction through the guide groove (15) in the truck (9) from said truck (9),
characterized in that

the truck (9) has a laterally projecting holding part (10), which includes a downwardly opened

receiving slot (11) for receiving the corner part of the L-shaped cross-arm (2),
whereby the vertical branch (6) of the L-shaped cross-arm (2) contains a compression spring (17) with a halyard (14) inserted into the corner part of the cross-arm (2) and guided through said compression spring, the end of halyard is attached to the compression spring (17) so that upon the tensioning of the halyard (14) through the flagpole (1), the corner part of the L-shaped cross-arm (2) is forced into the receiving slot (11) of the holding part (10),
whereby at the end of the vertical branch (6) of the L-shaped cross-arm (2) is a slider (7), to which a retaining loop (8) around the flagpole (1) is attached.

2. The cross-arm structure according to claim 1, **characterized in that** the holding part (10) is a separate detail from the truck (9), which is attached rigidly onto the truck (9).

3. The cross-arm structure according to claim 1, **characterized in that** the horizontal branch of the cross-arm (2) is adapted for receiving the extension (3) of the cross-arm.

FIG. 1

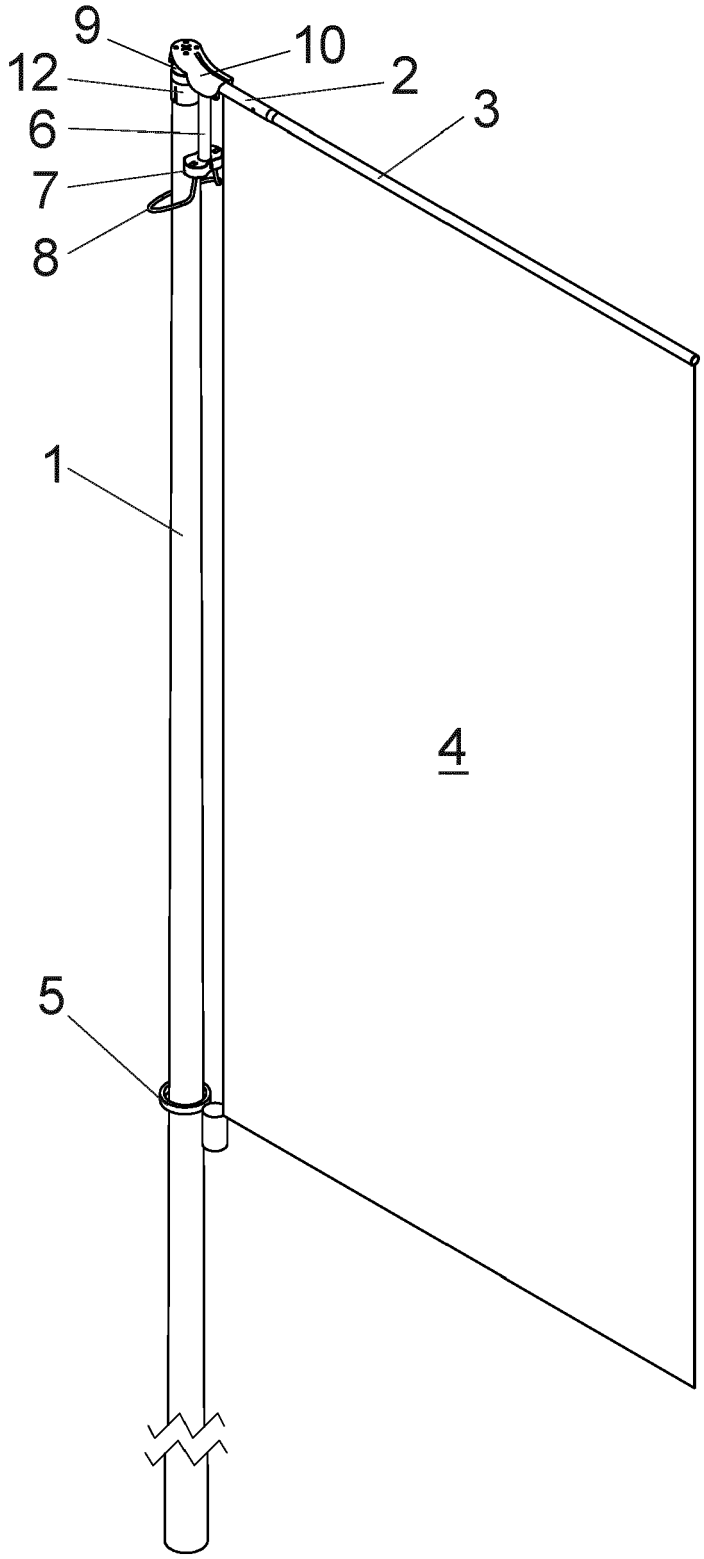


FIG. 2

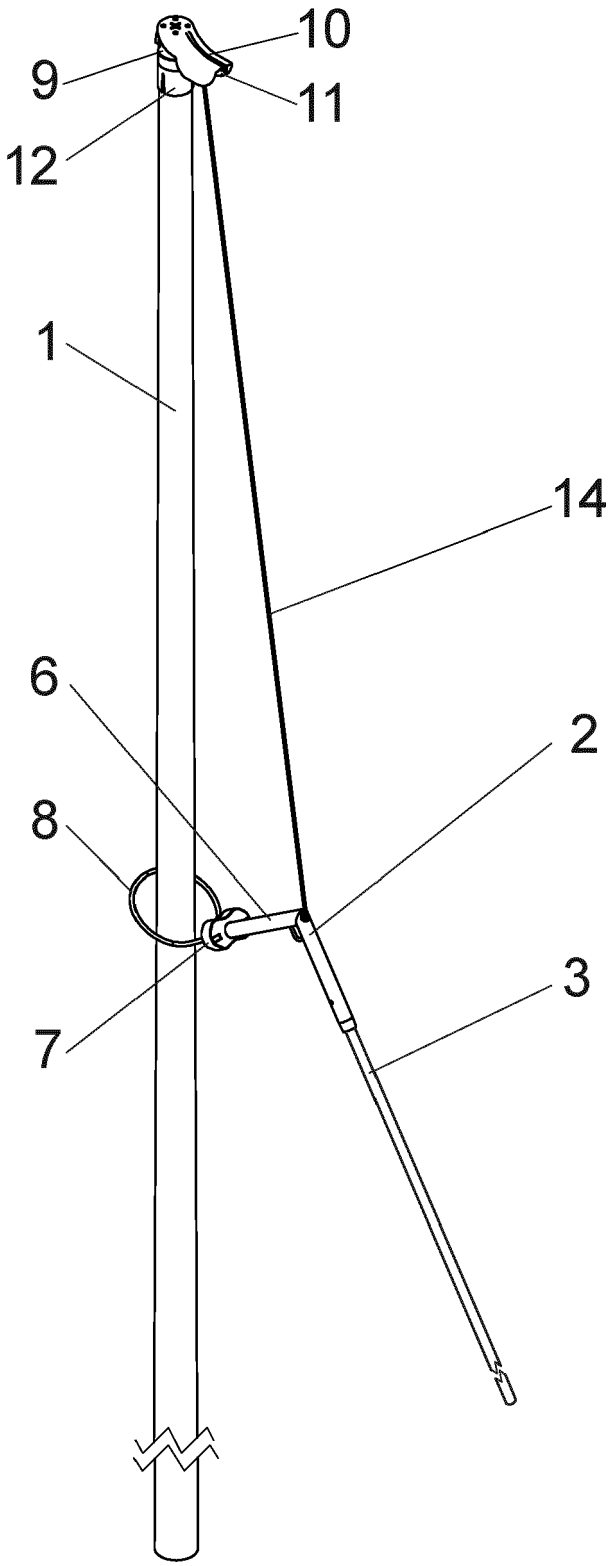


FIG. 3

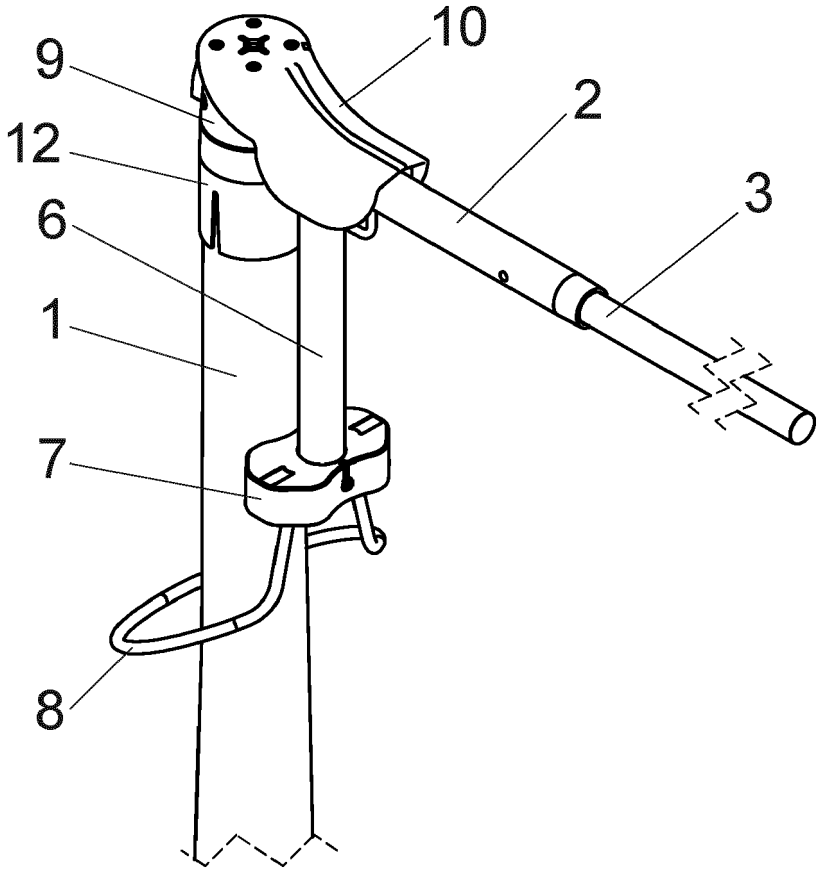


FIG. 4

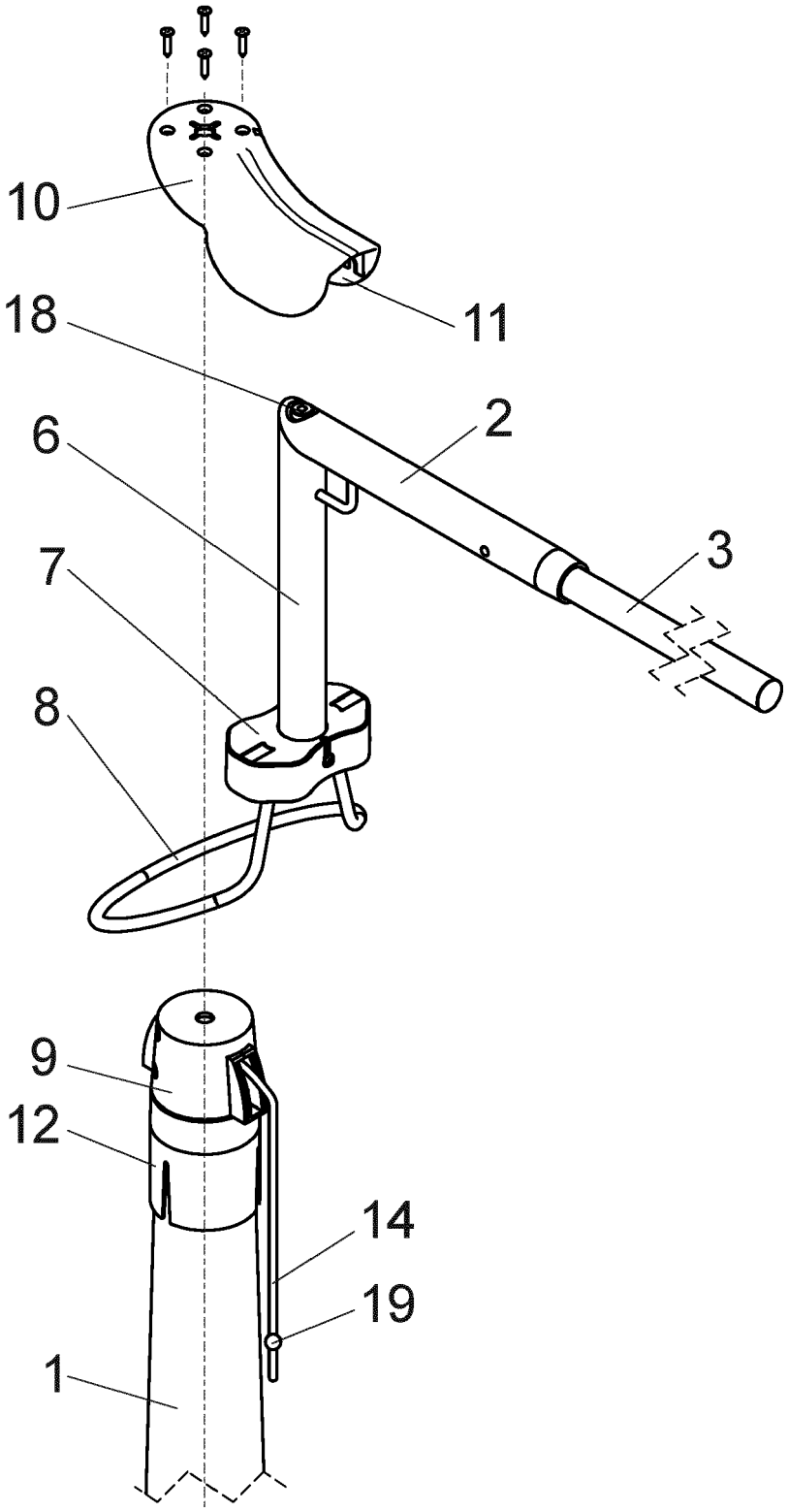
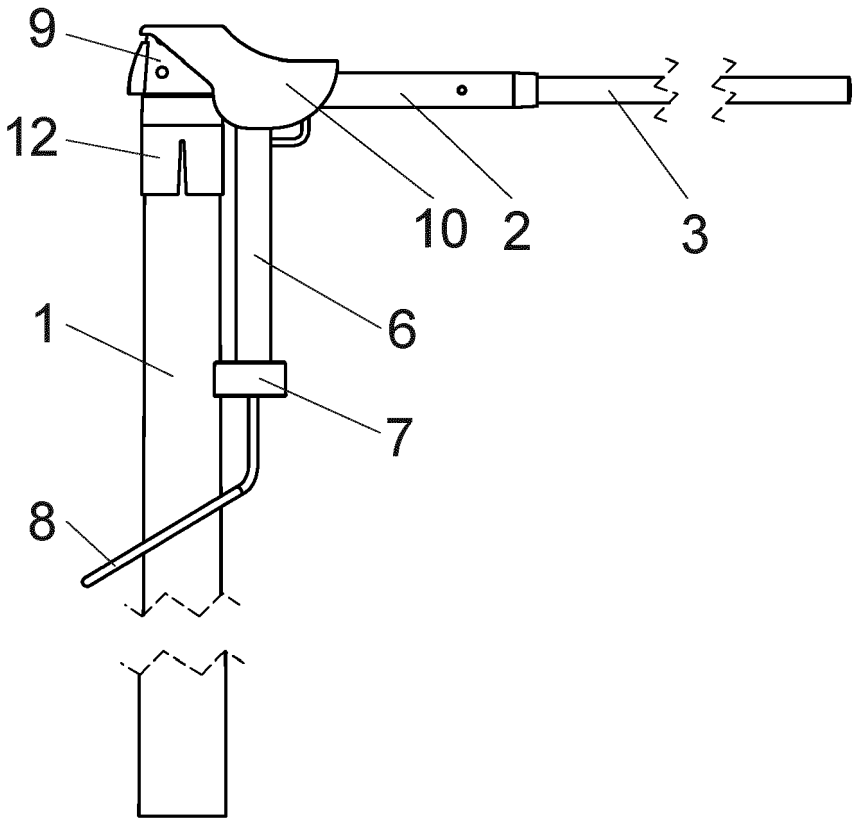


FIG. 5



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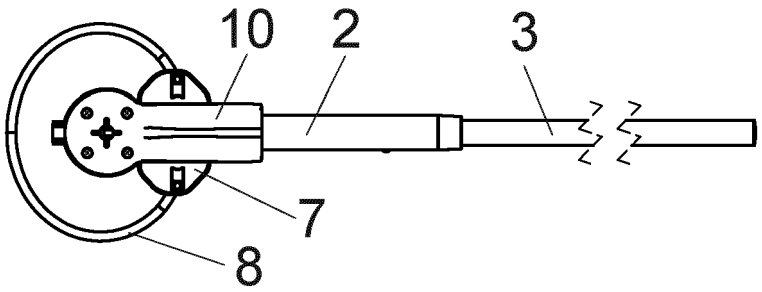


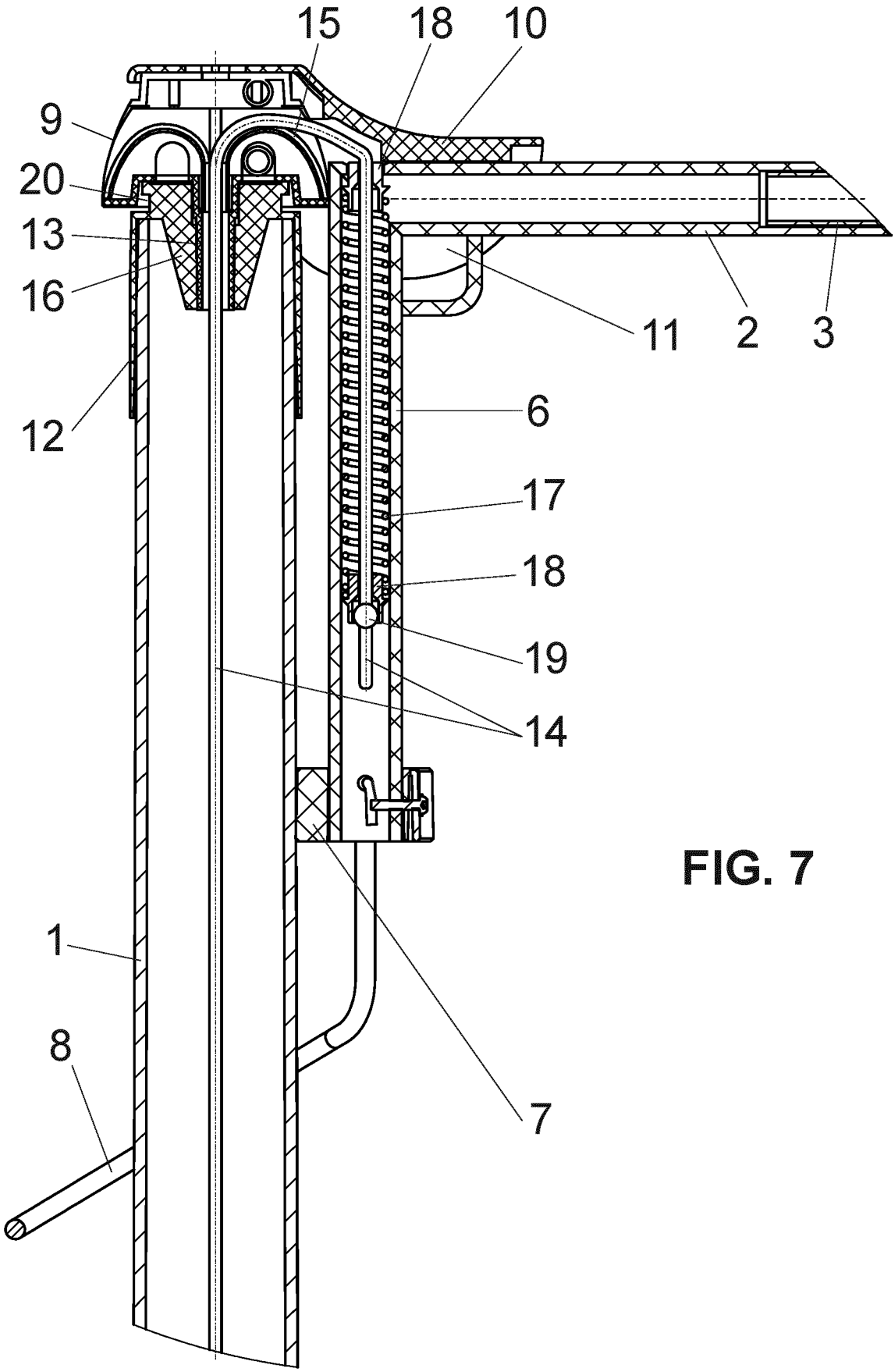


FIG. 7

FIG. 8

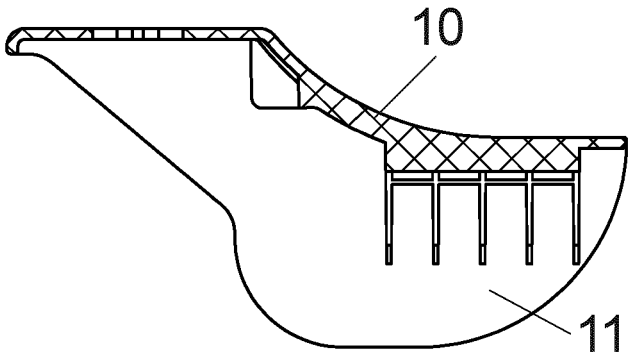


FIG. 9

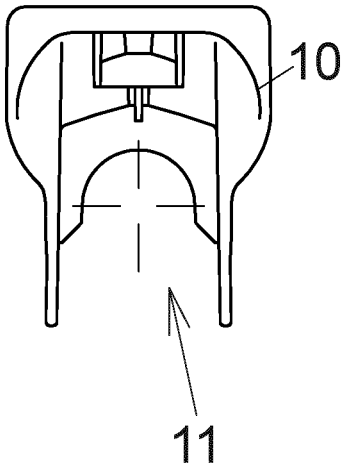


FIG. 10

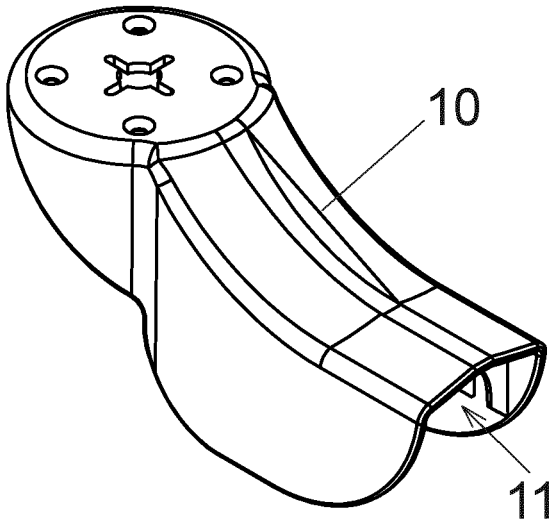


FIG. 11

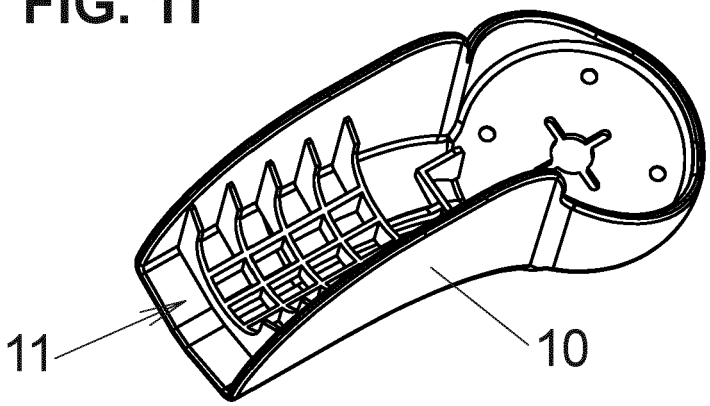


FIG. 12

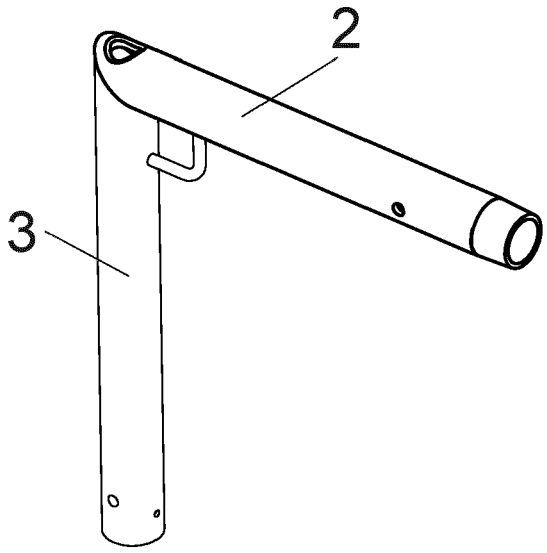
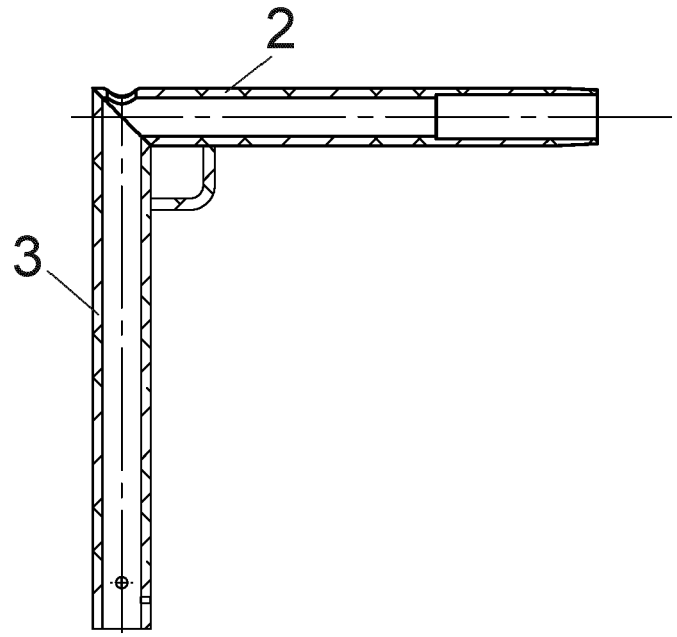


FIG. 13



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EUROPEAN SEARCH REPORT

Application Number
EP 23 16 2918

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 5 988 100 A (SCHMITT LARRY [US]) 23 November 1999 (1999-11-23) * column 5, lines 1-49 * * figures 1-10 *	1-3	INV. G09F17/00
X	JP 2001 056655 A (SAITO TEKKO KK) 27 February 2001 (2001-02-27) * abstract; figures 1-11 *	1-3	
X	KR 100 805 725 B1 (JANG JIN HO [KR]; JANG HO [KR]) 21 February 2008 (2008-02-21) * abstract; figures 1-6 *	1-3	
A	KR 102 041 113 B1 (KOREA INST IND TECH [KR]) 27 November 2019 (2019-11-27) * abstract; figures 1-8 *	1-3	

TECHNICAL FIELDS SEARCHED (IPC)

G09F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	31 August 2023	Zanna, Argini

CATEGORY OF CITED DOCUMENTS

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31-08-2023

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- US 6758159 B2 **[0010] [0012]**