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(54) Title: A MAST WITH A MECHANISM FOR PIVOTING THE ELONGATE POST

(57) Abstract: A mast (10) which includes an elongate post (12) with a first end (14) and a second end (16), the first end (14) being pivotally secured to a ground-engaging support base, at least a first mechanism (22) to restrict pivotal movement of the post (12), a winch (26) which is attached to the post (12), and a cable (28) which is engaged with the winch (26) and which is secured at one end to an anchor (30), wherein the winch (26) is actuable to allow the post (12) to pivot, from an elevated position, in a first direction (54) which lowers the post (12) against the action of the movement restricting first mechanism (22), and which is actuable to pivot the post (12) in a second direction (56) which opposes the first direction (54) to elevate the post (12).

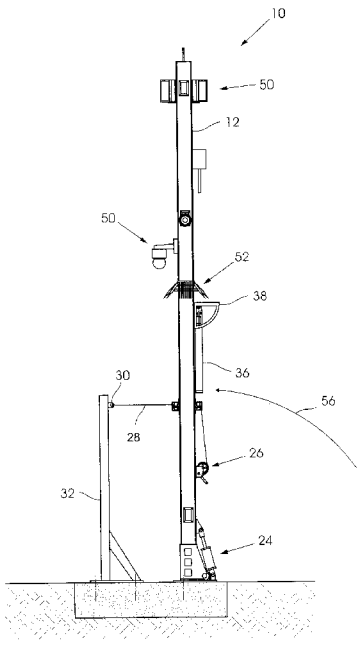

FIGURE 5

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A MAST WITH A MECHANISM FOR PIVOTING THE ELONGATE POST

BACKGROUND OF THE INVENTION

[0001] This invention relates to a mast.

[0002] Typically, a mast comprises an elongate post which is fixed to the ground. Components such as electrical equipment, e.g. security cameras, sensors, screens, or the like can be attached to an upper end of the post for monitoring and surveillance purposes.

[0003] Usually to safeguard such components against attack, vandalism and theft, the post is elongate with an upper end which is well above ground level.

[0004] The length of the post means a ladder is required for service of the components etc. This is time consuming and inherently there are dangers associated with ladders. If a post is pivoted to ground level for maintenance or access purposes, the weight of the post can give rise to problems.

[0005] Care must be exercised when the post is lowered to the ground for serious injuries or death, and damage to the components, can arise due to the weight of the post.

[0006] Generally, once the components have been accessed, the post must be elevated, and secured, in its vertical position, a process which can be laborious and dangerous.

[0007] The invention aims to address the aforementioned issues.

SUMMARY OF INVENTION

[0008] The invention provides a mast which includes an elongate post with a first end and a second end, the first end being pivotally secured to a ground-engaging support base, at least a first mechanism to restrict pivotal movement of the post, a winch which is attached

to the post, and a cable which is engaged with the winch and which is secured at one end to an anchor, wherein the winch is actuable to allow the post to pivot, from an elevated position, in a first direction which lowers the post against the action of the movement restricting first mechanism, and which is actuable to pivot the post in a second direction which opposes the first direction to elevate the post.

[0009] The first mechanism may comprise any suitable arrangement and preferably includes a piston and cylinder arrangement which acts between the post and the support base to inhibit pivotal movement of the post, in the first direction, away from a vertical position.

[0010] The piston and cylinder arrangement acts in a shock-absorbing way to restrict abrupt movement of the post, to enhance safety of operating for the arrangement inhibits free pivotal movement of the post as the post is lowered in the first direction to a predetermined angular extent relative to the vertical but allows such movement to take place in a gradual and controlled way.

[0011] The mast may include a second mechanism to restrict / stop pivotal movement of the post in the first direction. The second mechanism may act as a support which automatically becomes effective when the post is at a predetermined orientation relative to the vertical. The second mechanism may comprise a free-hanging elongate body which is attached to the post.

[0012] The body is movable under gravity action and takes up an orientation which allows the body to be ground-engaging, so as to support the post, when the post is lowered to a predetermined angular position relative to the vertical. This is a useful feature if the

second upper end of the post is to be accessed, e.g. for maintenance purposes. Additionally, though, the free-hanging body provides a back-up safety feature for, if the first mechanism should fail, the free-hanging body would prevent the post from hitting the ground.

[0013] The winch may be actuated manually or electrically.

[0014] The anchor may be at any suitable location and may comprise any suitable member or component. Preferably the anchor comprises an elongate member which is rigidly fixed to the support base and which defines an anchor point, for the cable, which is located at an elevated location above the ground.

[0015] The post may include a flange at the first end which is secured to the support base. The flange may be pivotally secured to the support base in any appropriate way using suitable fasteners which allow the post to be pivotable relative to the support base.

[0016] Sensing, monitoring, surveillance, communication and security components may be mounted at the second end of the post. The components, without limitation, may for example include a camera, a monitor, or the like.

[0017] The components may be protected by means of one or more deterrent elements which are secured at an elevated position to the post. The deterrent elements may be razor wire, barb wire, barb tape, spikes or the like.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] The invention is further described by way of example with reference to the accompanying drawings in which:

Figure 1 is a side view of a mast according to the invention;

Figure 2 is a view from another side of the mast shown in Figure 1;

Figure 3 is a view from an opposing side of the mast shown in Figure 2;

Figure 4 is a side view of the mast shown in Figure 1, in use, pivoted to a first position; and

Figure 5 is a side view of the mast shown in Figure 1, in use, pivoted to a second position.

DESCRIPTION OF PREFERRED EMBODIMENT

[0019] Figure 1 of the accompanying drawings is a side view of a mast 10 according to the invention.

[0020] The mast 10 includes an elongate post 12 with a first end 14 and a second end 16. The first end 14 is pivotally secured to a ground-engaging support base 20 (shown in detail in Figure 4). Figure 2 shows a view from another side of the mast 10 and Figure 3 shows a view from an opposing side of the mast 10.

[0021] A first mechanism 22 comprises a piston and cylinder arrangement 24 and is attached to and between the post 12 and the base 20.

[0022] A winch 26 is attached to the post 12 at an intermediate location. A cable 28 is engaged with the winch 26 and is secured at one end to an anchor point 30 which is at an elevated position on a rigid support member 32 which is fixed at a lower end of the support base 20 and which extends upwardly from the base in a vertical direction.

[0023] The mast 10 also includes a second mechanism 34. The second mechanism 34 comprises a free-hanging elongate body 36 which is pivotally attached to the post 12 more or less at a central location on the post 12.

[0024] The second mechanism 34 is attached to the post 12 via a bracket 38. This is exemplary only.

[0025] The post 12 includes a flange 40 at the first end 14 which is secured to the support base 20. The flange 40 is pivotally secured to the support base in any appropriate way using suitable fasteners 42, e.g. bolts, which allow the post to be pivotable relative to the support base 20.

[0026] Sensing, monitoring, surveillance, communication and security components 50 are mounted to the post 12 at its second end 16. The components, without limitation, are for example a camera, a monitor, or the like.

[0027] The components 50 are protected by means of one or more deterrent elements 52 which are secured to the post 12 at an elevated position. The deterrent elements 52 are razor wire, barb wire, barb tape, spikes or the like.

[0028] In use, the winch 26 is actuable to pay out the cable 28 from the winch 26. This process allows the post 12 to pivot in a first direction 54, under gravity action – shown in Figure 4. The winch 26 can be actuable in a reverse sense to move the post in a second direction 56, which is opposite to the first direction 54 – shown in Figure 5. The post 12 is thereby elevated and is returned to a vertical position.

[0029] The winch 26 can be actuated manually or electrically. In this example the winch 26 includes a handle 58 for manual actuation to pay out the cable 28. The elevated anchor point 30 allows for the winch action to be effective over the angular range of movement of the post. This would not be the case, if, for example the cable were to be anchored directly to the support base 20 i.e. if the support member 32 were not employed.

[0030] The cable 28 supports the post 12 and prevents it from falling to the ground. The first mechanism 22 and the second mechanism 34 provide safety and security by preventing the post 12 from falling to the ground if the cable 28 were to break. The mechanism 22 in effect acts a shock-absorber and allows the post to move downwardly in a controlled and safe way. Thus, in use, the first mechanism 22 restricts pivotal movement of the post 12 relative to the support base 20 to dampen such pivotal movement and thereby to prevent abrupt movement of the post. The second mechanism 34 restricts, in this case stops, pivotal movement of the post 12 when the post 12 is at a predetermined orientation relative the vertical. The free-hanging elongate body 36 pivots relative to the post 12, i.e. moves / swings under gravity action, away from the lowering post 12, and remains vertically orientated so that if the cable 28 were to break and if the mechanism 22 failed, the post 12 would not fall to the ground but would be restricted by and fall onto the free-hanging elongate body 36 which would become ground-engaging and support the post 12.

[0031] When the post is elevated the mechanism 22 also allows for controlled movement, so that abrupt movements are eliminated.

[0032] The advantages of the pivoting mast 10 are that it allows the second end 16 and the components 50 to be lowered in a controlled way to a position at which the components are readily accessible. This is ultimately safer and less likely to give rise to injuries, death,

or damage to the components 50. No machinery and equipment, such as ladders and hoists, are required to elevate individuals to access the components 50.

[0033] The pivotal mounting of the post to the ground-engaging support base enables the mechanism 22 to be effectively used and for pivotal movement to be controlled by means of the winch, compared for example to a construction in which a half section of the post would be pivotal about a centre point of the post.

CLAIMS

1. A mast which includes an elongate post with a first end and a second end, the first end being pivotally secured to a ground-engaging support base, at least a first mechanism to restrict pivotal movement of the post, a winch which is attached to the post, and a cable which is engaged with the winch and which is secured at one end to an anchor, wherein the winch is actuable to allow the post to pivot, from an elevated position, in a first direction which lowers the post against the action of the movement restricting first mechanism, and which is actuable to pivot the post in a second direction which opposes the first direction to elevate the post.

2. A mast according to claim 1 wherein the first mechanism includes a piston and cylinder arrangement which acts between the post and the support base to allow controlled gradual pivotal movement of the post as the post is lowered in the first direction to a predetermined angular extent relative to the vertical.

3. A mast according to claim 1 or 2 which includes a second mechanism to prevent pivotal movement of the post in the first direction.

4. A mast according to claim 3 wherein the second mechanism acts as a support which automatically becomes effective when the post is at a predetermined orientation relative to the vertical.

5. A mast according to claim 4 wherein the second mechanism comprises a free-hanging elongate body which is pivotally attached to the post.

6. A mast according to claim 5 wherein the body is movable under gravity action and takes up an orientation which allows the body to be ground-engaging to support the post when the post is lowered to a predetermined orientation relative to the vertical.

7. A mast according to claim 1 wherein the anchor comprises an elongate member which is rigidly fixed to the support base and which defines an anchor point, for the cable, which is located at an elevated location above the ground.

8. A mast according to claim 1 wherein the post includes a flange at the first end which is secured to the support base.

9. A mast according to claim 8 wherein the flange is secured to the support base which allows the post to be pivotable relative to the support base.

10. A mast according to claim 1 which includes components mounted at the second end of the post.

11. A mast according to claim 10 wherein the components include sensing, monitoring, surveillance, communication and security components.

12. A mast according to claim 10 which includes deterrent elements that are secured at an elevated position to the post to protect the components.

13. A mast according to claim 12 wherein the deterrent elements include razor wire, barb wire, barb tape, or spikes.

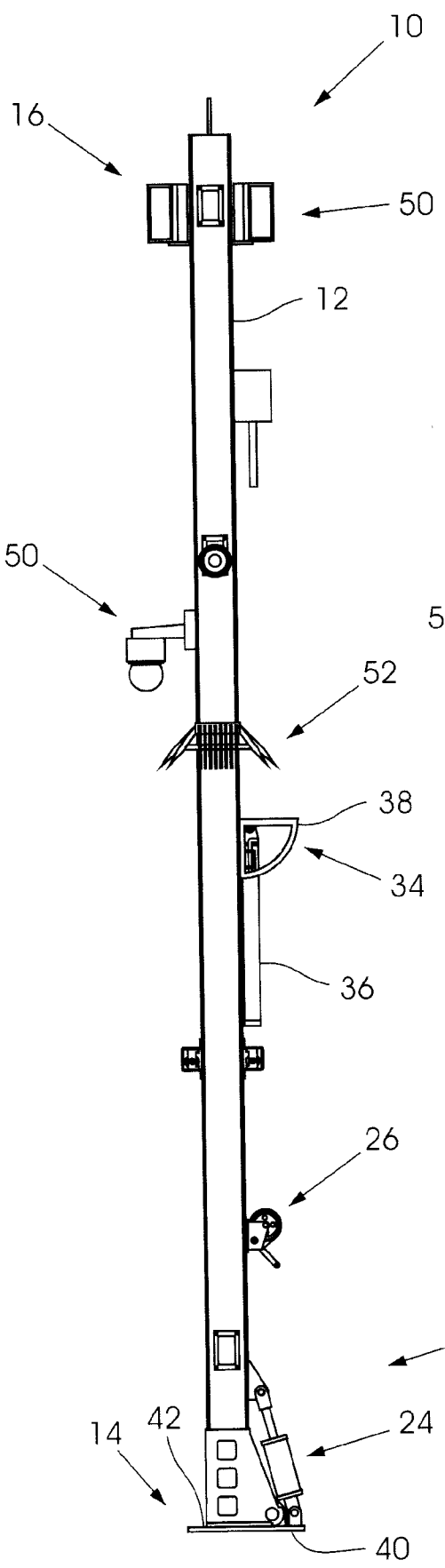

FIGURE 1

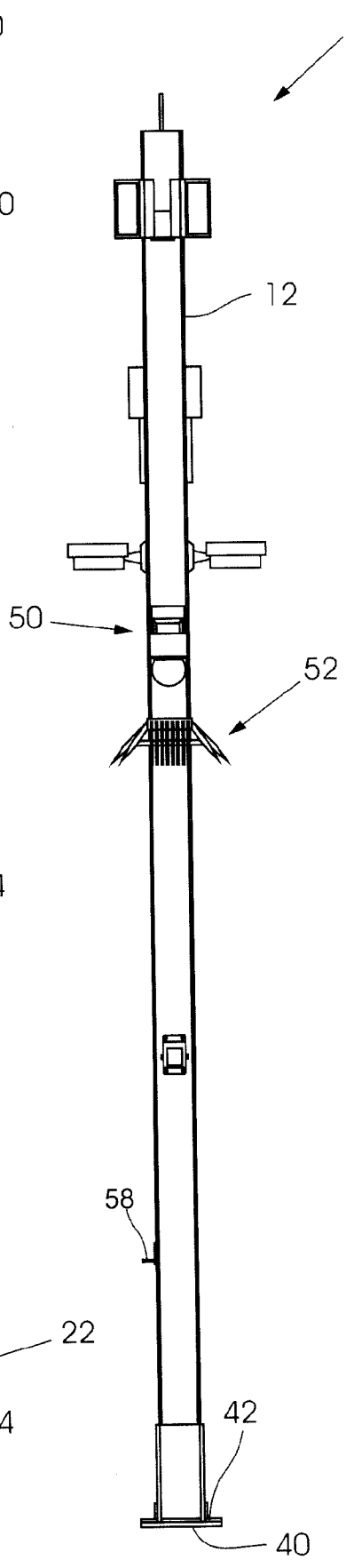

FIGURE 2

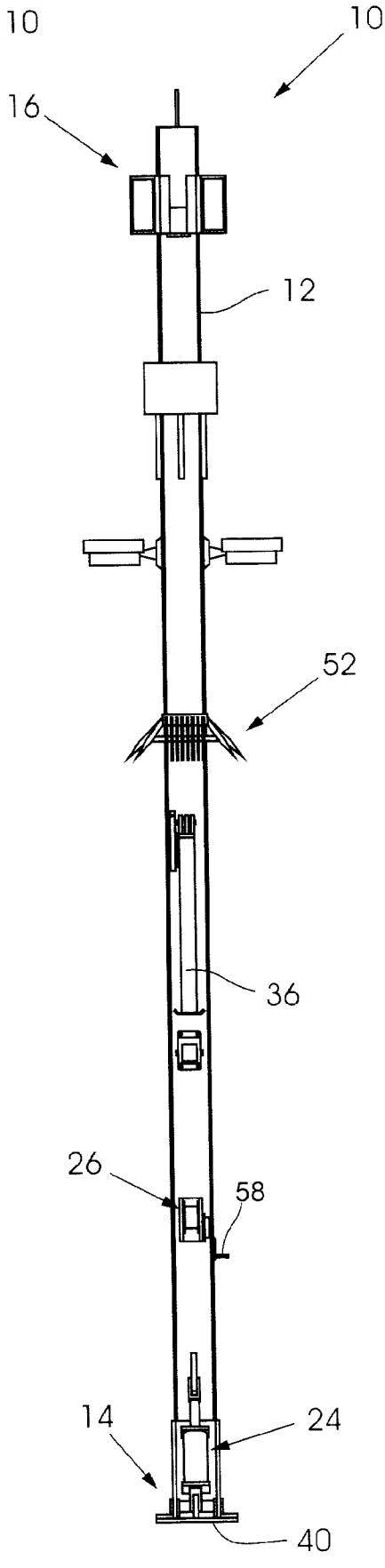

FIGURE 3

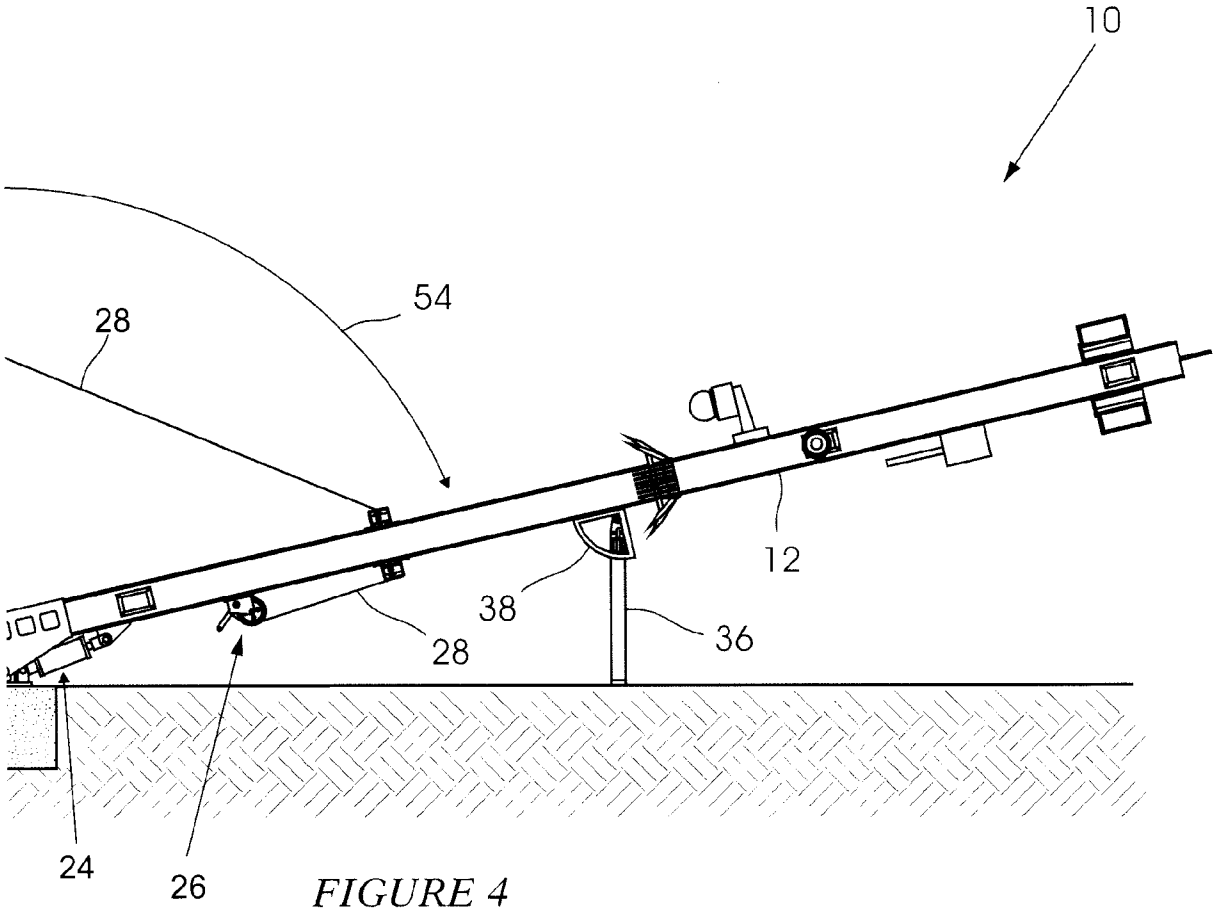

FIGURE 4

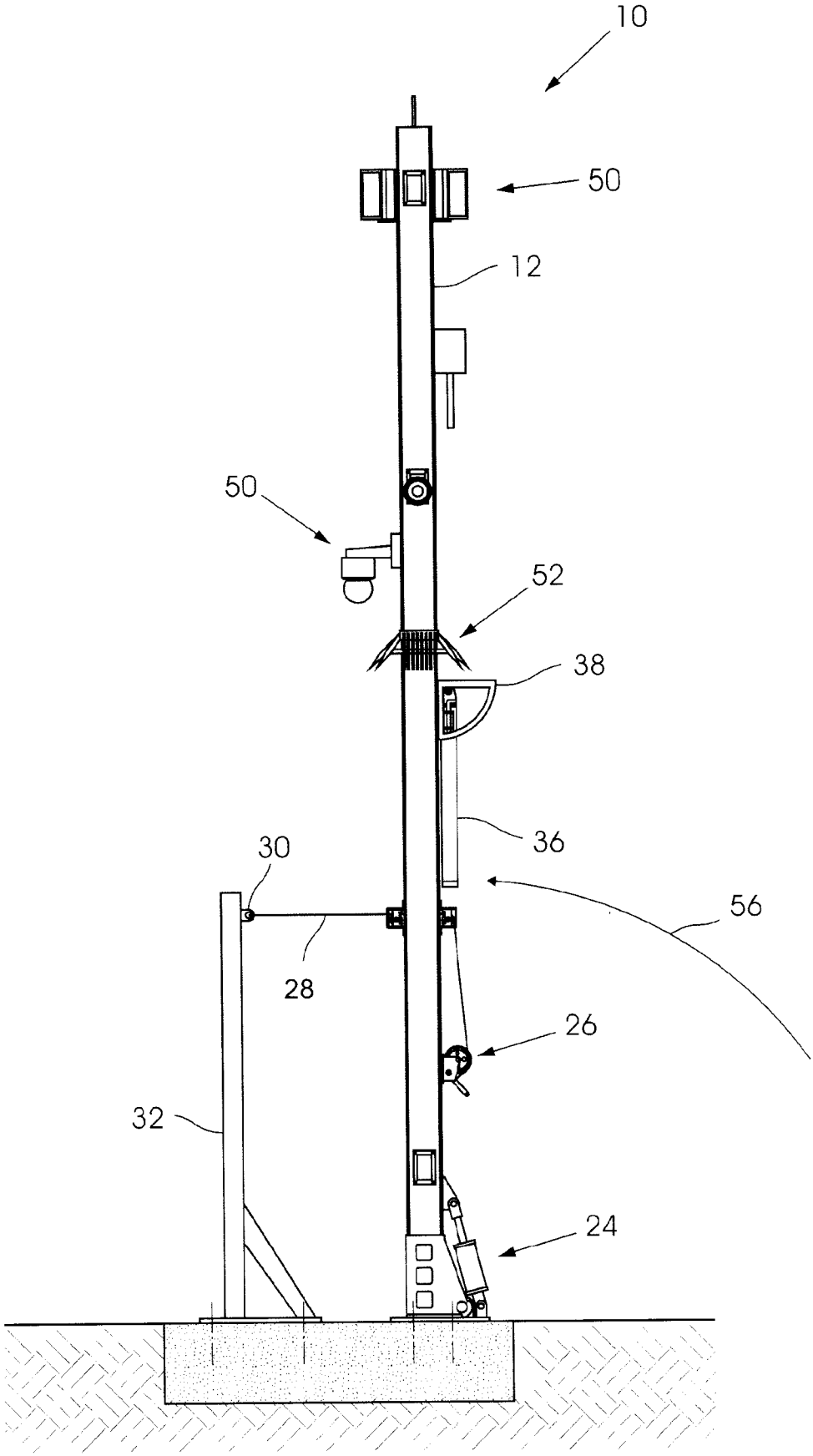

FIGURE 5

INTERNATIONAL SEARCH REPORT

International application No.
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A. CLASSIFICATION OF SUBJECT MATTER
IPC: ***E04H 12/18*** (2006.01); ***E04H 12/34*** (2006.01); ***E04H 12/22*** (2006.01)

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)
E04H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 2016060890 A1 (VAN WYK JONATHAN) 03 March 2016 (03.03.2016) abstract; figures 1-3; description of figures; claims 1-17	1-13
X	CA 3001820 A1 (CHAMBERS WALTER) 17 October 2019 (17.10.2019) abstract; figures 1-2, 4a, 7; description of figures; claims 1-11	1-11
X	US 7089705 B1 (LIEBERMAN PHILLIP L.) 15 August 2006 (15.08.2006) abstract; figures 1-2; description of figures; claims 1-6	1-4, 7-11
X	AU 2016228198 A1 (POLLARD MATTHEW) 06 October 2016 (06.10.2016) abstract; figures 1-4; description of figures; claims 1-14	1, 2, 7-11
A	EP 3536878 A1 (TIONESTA LLC) 11 September 2019 (11.09.2019) abstract; figures 1-2; description of figures; claims 1-18	1-13

Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
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International application No.
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C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	AU 2019100584 A4 (DRAFFIN MARK MR) 11 July 2019 (11.07.2019) abstract; figures 1-8; description of figures; claims 1-9;	1-13

Patent document cited in search report	Patent family member(s)	Publication date
US 2016060890 (A1)		
	AU 2015101924 (A4)	2019-05-09
	AU 2015221469 (A1)	2016-03-17
	AU 2017100111 (A4)	2017-03-02
	AU 2017100111 (B4)	2017-04-13
	US 2016060890 (A1)	2016-03-03
CA 3001820 (A1)		
	CA 3001820 (A1)	2019-10-17
	CA 3001820 (C)	2021-03-23
	MX 2018009280 (A)	2019-10-18
US 7089705 (B1)		
	US 7089705 (B1)	2006-08-15
AU 2016228198 (A1)		
	AU 2012216750 (A1)	2014-03-27
	AU 2016228198 (A1)	2016-10-06
EP 3536878 (A1)		
	AU 201812903 (S)	2018-08-03
	AU 2019201677 (A1)	2019-09-26
	EP 3536878 (A1)	2019-09-11
	JP 1626798 (S)	2019-03-18
	JP 2019157616 (A)	2019-09-19
	KR 20190106816 (A)	2019-09-18
	US 10477715 (B2)	2019-11-12
	US 2019150310 (A1)	2019-05-16
	US D878340 (S)	2020-03-17
AU 2019100584 (A4)		
	AU 2019100584 (A4)	2019-07-11