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(54) **FIRE-PROOF BARRIER POLE, CORRESPONDING ENCLOSURE, STRUCTURE COMPRISING SUCH ENCLOSURE AND POLE, AND TACTICAL FIRE-PROOF BARRIER**

(57) The present invention is in the area of firefighting means, specifically fire control barriers, typically forest fires. An object of the present invention is a pole (1) for a fire proof barrier and enclosure (2), which enables a solution that is only activated, having an effect on the firefighting, when there is a need for such, since the enclosure (2) is capable of being buried in the ground, and since the pole (1) is suitable for being inside the enclosure, there is no element above the ground when there is no need for firefighting. Additionally, it is also an object of the present invention a structure comprising said pole (1) and enclosure, and a tactical fire-proof barrier which comprises a plurality of structures. The present invention provides, in relation to prior art, a tactical fire-proof barrier solution which is erectable in a swiftly and effective way.

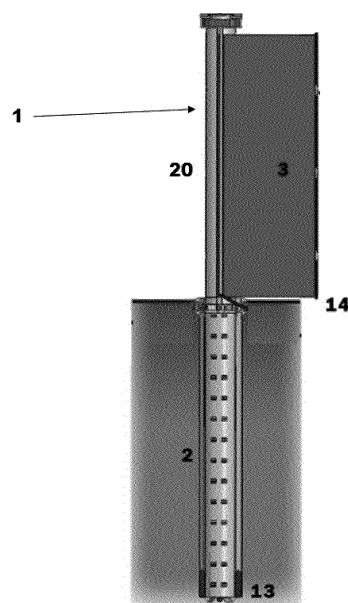


Figure 3

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## Description

### FIELD OF THE INVENTION

**[0001]** The present invention is included in the field of firefighting means and technology, specifically fire-proof barrier, typically wildfires.

### PRIOR ART

**[0002]** The present invention finds a closer background in the field of physical barriers for wildfire fighting and sustaining, which are permanently installed in areas susceptible to the occurrence of wildfires.

**[0003]** An example of this is the patent application number US2010294520A1.

**[0004]** Forest fires are an increasingly serious problem, as the effects of global warming worsen.

**[0005]** Conventional fire front containment strategies use different techniques, including the use of airplanes and helicopters to deploy water and chemical retardants on the fire front; the use of controlled backfires; and the strategic deployment of firefighters equipped with carbon dioxide fire extinguishers and water hoses from fire engines, alongside the fire front. Firefighters also use hand tools, axes, chain saws, etc., as well as the use of heavy machinery, such as bulldozers and excavators, to cut and collect biomass, thus creating vegetation clearings and fuel breaks, in an attempt to form lines of protection, often along the roads, in the hope that the fire will not cross them.

**[0006]** The present invention provides, in relation to the solutions of the state-of-the-art technology, a tactical fire-proof barrier solution that is very fast and effective to use and deploy.

### SUMMARY OF THE INVENTION

**[0007]** It is thus object of the present invention a fire barrier pole (1), which comprises a hollow shaft (20), comprising a groove extending longitudinally, containing therein a rolled and removable fire-proof screen (3) to the exterior of the hollow shaft (20) through said groove, and comprising additionally, a plurality of fastening means (18) (preferably consisting of a rack) arranged longitudinally on an outer surface of the hollow shaft, which are suitable for attachment to corresponding receiving means (10) of an enclosure.

**[0008]** In a preferred mode when associated with an enclosure, the hollow shaft (20) comprises, at its top, a section having a larger diameter, suitable for coupling into a larger diameter section of a corresponding enclosure (2).

**[0009]** Also an object of the present invention is a corresponding element to the pole (1) described, corresponding to a possible embodiment associated with the pole (1), in particular a tubular enclosure (2) for receiving a pole (1) of a fire-proof barrier, having a section having

a larger diameter and a smaller section diameter and:

- The larger diameter section is arranged on the top of the enclosure, being suitable for receiving and coupling a section of larger diameter of a fire barrier pole (1);
- At least two receiving means (10) (preferably consisting of latches) arranged within the larger diameter section of the first top, projecting radially into the enclosure, and suitable for receiving corresponding fastening means (18) from a fire barrier pole (1).

**[0010]** The pole (1) and the enclosure (2) described above are elements which, when combined and by action of elements present in the (1) (fastening means (18)) and elements present in the enclosure (2) (receiving means (10)), as well as through the configuration of both, enable the creation of a highly simple solution to activate, and it is even possible to install manually by a single operator, and quite effectively. With the present configuration of the pole (1) and complementary enclosure (2), the present invention enables a solution that is only activated, having an effect in the fight against fire, when there is a need for such, since the enclosure (2) is capable of being buried in the ground, and since the pole (1) is suitable to be placed inside the enclosure, there is no element above ground when there is no need for deployment of firefighting measures.

**[0011]** In addition, the handle means (4) is preferably foldable on the larger diameter section of the hollow shaft (20), to enable the best accommodation of the pole (1) on the ground.

**[0012]** In an advantageous mode of the pole (1) of the present invention, this further comprises at least two equally spaced holes (19) arranged on the outer surface of its second top, projecting radially to the center of the pole (1), each suitable for receiving a corresponding male element (11) from the enclosure (2), the pole (1) preferably comprising four equally spaced holes (19).

**[0013]** Accordingly, the enclosure (2) of the present invention further comprises at least two male elements (11) likewise spaced on the inner surface of its second top and projecting radially each being resilient and suitable for coupling in a bore of the fire barrier pole (1), the enclosure (2) preferably comprising four equally spaced male elements (11). The male elements (11) preferably consist of spring stabilizing bars.

**[0014]** This enables an adequate fixing of the pole (1) on the enclosure, when placing the pole (1) in a said active position, projected towards the outside of the enclosure (2), and hence of the ground - when the enclosure (2) is installed below the ground.

**[0015]** In an alternative realization of the pole (1) object of the present invention, this further comprises means for securing (18) to the ground, preferably elements such as protrusions adapted for fixation in the ground, optionally in stake. In this embodiment, the pole (1) does not provide a solution in which it is associated with a buried

enclosure (2) being directly fixed to the ground.

**[0016]** Also an object of the present invention is a pole structure for a fire barrier comprising the pole (1) and the enclosure (2) at present described, the pole (1) being arranged inside the enclosure, and therein being retractable by coupling the fastening means (18) to the receiving means (10).

**[0017]** It is further an object of the present invention a pole structure for a fire barrier comprising:

- The pole (1) of the present invention - except in the embodiment which comprises the fastening means (18) to the ground - and a mobile ground robotic vehicle (21), on which said pole (1) is mounted, the robotic vehicle (21) containing locking means adapted to block its movement and preferably four wheels, or
- The pole (1) of the present invention in which it comprises securing means (18) to the ground.

**[0018]** It is still an object of the present invention a fire barrier which comprises at least two of the pole structures as described above, each of the pole structures being at a maximum distance of at least one other pole structure such that this maximum distance corresponds to the maximum length of the fireproof fabric (3) of at least one of these pole structures, and each of the enclosures (2) of the structures being buried in the ground, such that the respective pole (1) is deployed by raising it above the ground.

## DESCRIPTION OF FIGURES

### [0019]

Figure 1 - A representation of an embodiment of the pole (1) of the present invention, suitable for coupling to an enclosure.

Figure 2 - An embodiment of the enclosure (2) of the present invention.

Figure 3 - An embodiment of the barrier pole structure of the present invention, comprising a pole (1) and a buried enclosure (2).

Figure 4 - A representation of a detail of the embodiment of the pole (1) of the present invention, detailing one of the fastening means (18).

Figure 5 - A detail of an embodiment of the pole (1) of the present invention suitable for coupling to an enclosure.

Figure 6 - Representation of another embodiment of the structure of the present invention, comprising a pole (1) and a robotic ground vehicle (21), on which the pole (1) is mounted, the robotic vehicle (21) com-

prising four wheels,

## DETAILED DESCRIPTION OF THE INVENTION

**[0020]** The more general and advantageous embodiments of the present invention are described in the Summary of the invention. These configurations are detailed below, in accordance with other advantageous and / or preferred modes of implementation of the present invention.

**[0021]** In one configuration of the pole (1) of the present invention, it comprises additionally:

- a protruding section for locking (5) of the pole (1) in means corresponding to an enclosure, arranged between the first top of the hollow shaft (20) and the handle means (4) and

the handle means (4) being rotatable about the hollow shaft (20) between a first and a second position, and the protruding locking section (5) being integral with the handle means (4). This allows the pole (1) to be locked, when in the closed position - inside the enclosure (2) - in such a way that it does not easily come outwards, requiring a rotation movement by an operator.

**[0022]** Accordingly, the enclosure (2) further comprises i) a plurality of resilient lifting elements (12) which are inside the larger diameter section of the first top and which extend longitudinally and ii) preferably comprises a plurality of bearings (7) arranged longitudinally and along the inner surface of the enclosure (2), preferably in pairs. Such resilient elements aid in the raising of the pole (1) at the initial moment after it is unlocked, and consists of preferably in four springs.

**[0023]** In another embodiment of the pole (1) of the present invention, the screen (3) comprises:

- a fixing side arranged in such a way that - in unrolling the screen, the fixation side extends parallel to the central rod - this side comprising a plurality of coupling means for a second pole (16), suitable for securing the screen to a second pole (1) and

the hollow shaft (20) comprising:

- on its outer surface a plurality of reception means (10) of the coupling means for the second pole screen (17), arranged longitudinally and diametrically opposed to said groove, suitable for securing the hollow shaft (20) to a second pole screen (17) and the coupling means for second pole (16) and

the receiving means (10) of means for second pole screen (17) using preferably magnetic attachments. This is a highly simple and efficient way of securing a pole (1) to another, thus building an easily installable tactical barrier.

**[0024]** In a preferred mode of that described above,

the pole (1) comprises additionally, a rigid rim (14), preferably a metal bar, fixed and extending along the entire fixing side of the fire-proof screen (3), and which comprises said second pole coupling means (16), the collar (14) comprising at least one cutout forming a handle (15), any one of these cutouts being arranged adjacent one of the coupling means for second pole (16)

**[0025]** In yet another preferred mode of the pole (1) of the present invention, this comprises a housing (6) in said larger diameter section, said housing compartment (6) having transparency and comprising therein electronic components for control and:

- lighting means and / or
- sound and

the control electronics being configured to operate for a pre-defined period of time, the lighting means and / or the sound means under coupling of the pole (1) to a second pole (1) by means of:

- the coupling means for second pole (16) or
- the receiving means (10) of coupling means for the fire-proof screen of the second pole (17).

**[0026]** In an advantageous mode of the enclosure (2) of the present invention, this further comprises a first chamber surrounding the larger section diameter, said first chamber comprising therein at least one tubing (8) arranged between two holes suitable for securing the tubing (8) of the first chamber and, preferably:

- the first chamber comprising two pipes and two pairs of holes suitable for securing tubing (8);
- the receiving means (10) being constituted by a latch and a spring, the spring being secured in said first chamber and the means of (10) extending into the first chamber and preferably, the two pipes are sequentially connected. This enables spray media in each enclosure, and therefore potentially on each pole.

**[0027]** In a preferred mode of the enclosure (2) of the present invention, this further comprises, around its smaller diameter section, a second chamber comprising a counterweight system (13) therein with means suitable for attachment to a fire barrier pole (1). This makes it easier to raise the pole (1) which will be inside the enclosure (2) from the closed position - fully inside the enclosure (2) - to the open position, to the maximum possible extent outside the enclosure, by the counterweights, which additionally are well accommodated in said second chamber, which is important, since it is intended that the enclosure (2) is buried in the soil.

**[0028]** In yet another preferred mode of the enclosure (2) of the present invention, comprises a plate arranged around the larger diameter section. It facilitates the positioning of the barrier vertically, perpendicular to the

ground, and its maintenance in that position.

**[0029]** In an advantageous mode of the structure of the present invention, the control electronics of the pole (1) are configured to activate the lighting means and / or sound means for a predetermined period of time under the additional condition of the handle means (4) of the pole (1) is rotated and the at least two holes (19) equally spaced engage the male elements (11) of the enclosure.

## 10 EMBODIMENTS

**[0030]** The process of switching to the active position of the fire barrier, according to the present invention, is very fast, since the most complicated, time-consuming and heavy part of the assembly work will have been carried out during the pre-installation process of the poles (1) and enclosures (2). For the underground placement of each pole (1) it will be necessary to dig a hole, by mechanical means, of an approximately two and a half meters deep - and the creation of a ditch through which a hose will pass for connection to the water pipes, this trench shall be fully covered at ground level in order to restore both as possible, the appearance and functionality of the surrounding environment, as there were before pre-installation.

**[0031]** The tactical barrier will be easily assembled by a single operator, who quickly and without the need to resort to significant physical force, should rotate the upper circular handle means (4) to unlock the pole (1), erect completely the pole (1) until the blue light on the top lights up. The operator must repeat this process to all poles. After placing the last pole (1), the operator pulls the fire-proof screen (3) while walking in the opposite direction to what he did before, and then attaches it to the next pole coupling means. When attaching the screen to the consecutive pole (1), the user should observe that the light at the top of the pole (1) changes to green, indicating that the system has been well assembled and is fully functional. This process must be repeated until the perimeter closes. It is intended that any adult, independently of their age and physical condition, can easily and in a short time establish the perimeter of security of the space to protect.

**[0032]** With regard to the space where the barrier will be implemented, whereas it is used for agricultural, pastoral, garden, to function as an orchard or even as a car park, it is noted that the space occupied by the covers of the enclosure is minimal and negligible, thus limiting the disadvantages of the existence of this protection, concerning its visual impact and impairment of the space and its functionality. That is, the only visible parts will be the small lids, arranged at ground level with, for example, about 30 cm of diameter and separated from each other at distances up to 50 meters, depending on several factors, to be set at the time of pre-installation.

**[0033]** The poles shall be installed at regular intervals, with up to 50 meters of distance between two consecutive poles, thus ensuring the pre-definition of the perimeter

of site protection. In the inactive state, the poles are completely below the ground, thus limiting the inconveniences of their presence, specifically the visual and aesthetic impact and also of their susceptibility to theft and vandalism.

**[0034]** In one embodiment, the structure of the present invention comprises fire detection means, specifically sensors suitable for this purpose.

**[0035]** Specifically, in this embodiment each pole (1) comprises a set of sensors for temperature, humidity, wind speed, acceleration, smoke detection and concentration measurement, a GPS and 3G telecommunication system, and a set of warning mechanisms, including a siren and a multicolored LED device.

**[0036]** According to the calculations made, it is estimated that the barrier, for an extension of about 100 meters takes no more than 15 minutes to be mounted on site, taking into account a single operator to carry out this process. With 2 people, it is estimated that a barrier of 300 meters can be mounted in 15 minutes.

**[0037]** This concept is part of the strategic principle of separating fuel of the forest fire, giving an application for the various types of fiber flame retardants that have been flooding the market.

**[0038]** A description of the method of installation of the fire barrier of the present invention is described below.

**[0039]** After defining the characteristics of the project to be carried out in each client, the pre-installation will be carried out, more precisely the excavation of each one of the holes (25cm of diameter by 2m of depth), by mechanical means, intended for insertion of the enclosures (2) of the poles. These enclosures (2) are placed in the vertical, so that the poles, when raised, also become right and perpendicular to the ground. The distance between the poles should take into account the typology of the terrain, but should not exceed 50 meters.

**[0040]** After placement of the enclosures (2), small channels are excavated to pass the water and electricity network. After this, the hoses and all the electronic components of the enclosure (2) are installed.

**[0041]** Finally, the poles are placed, with the screen roll already in the interior.

**[0042]** At the end of the installation only the top lids remain visible, as well as the respective red handles for the opening of the poles.

**[0043]** After the performance tests are carried out, the pre-installation of the structure will be considered complete and the barrier will be operational so that one day can be used in the event of the outbreak of forest fires in the area.

**[0044]** After correct pre-installation, the entire system is designed to be easily and quickly assembled in an emergency, even in poor visibility during the day or night. Can be assembled by anyone without any tools or considerable physical strength. According to In calculations made, it is estimated that the barrier assembly, for a fence extension of 100 meters takes a maximum of 10 minutes to be mounted on site, taking into account one operator

to carry out this process; With 2 people, it is estimated that a 300 m barrier can be mounted in no more than 15 minutes.

**[0045]** An application developed for computer or smartphone, will allow to share data between users, authorities, fire fighters, meteorology services and automatically inform and alert all users and entities in the area. Knowing the direction of the fire front, wind intensity and terrain configuration available by online services, this application will employ fire behavior models to predict fire progression and will advise the user about the barrier to be deployed and the timeframe to do it. The user may choose to raise the whole perimeter of protection or only one section of this perimeter that is more critical if time is scarce. After raising the poles, the sensors they have will communicate with the application in real time and enable the user to monitor the fire's progress and the effectiveness and integrity of barriers. However, the user can act totally independent from the application, being this only a complementary tool and not indispensable.

**[0046]** After mounting the protection perimeter, the system will operate in an autonomous manner and the user may move back into a security space, or even leave the premises, if required. The poles that establish the safety perimeter must have a steady green light, indicating that they are assembled correctly and the system is fully operational.

**[0047]** During the fire, the operation of the barrier and the data of all its sensors (temperature, physical integrity) can be consulted from a distance through the mobile application or on the internet.

**[0048]** When the fire approaches a section of the barriers, the alarm and the water circulation system is activated on the poles and begins the water sprinkling on the canvas and terrain of that perimeter section. The light at the top of the pole (1) changes also from green to orange. The combination of fire proof screen (3) and spray water has been tested to successfully withstand a considerable fire front. If the fire front intensity is very high and the screen in a particular section is destroyed, the poles adjacent to this section change their lights from orange to bright red and trigger the horn, signaling that the perimeter at this point was compromised. If the barrier is mounted to protect an escape route, you should avoid points that have been compromised. The red lights and the horn warn the user of areas to be avoided if the conditions of visibility, due to high smoke concentration for instance, do not allow to make that immediate assumption.

**[0049]** The proposed equipment has been developed in such a way that it can be reused even after being exposed to a fire. This inspection should be always done by specialized technicians. After being raised, poles may return to the enclosures (2) below the ground. This process despite being easy to do should only be carried out by specialized technicians, as it involves the dismantling of components (2) and handling of heavy components. After this inspection, a certificate is issued on how the

system is again fit to be used, and an effectiveness equal to that of a brand new system is ensured.

[0050] The enclosure structure must be made of aluminum, then coated with a layer (varnish) resistant to moisture and corrosion. The resistance to high temperature is not necessary, since this structure will always be underground and not directly exposed to fire. The method of manufacture shall entail embossing and extrusion. The thickness of the plate should be around 2 or 3 mm in the most critical areas and the total weight of the structure will be around 80kg.

[0051] This enclosure (2) will have in its interior, besides the pole (1), batteries, hoses where water circulates by spraying on the screen and a 70 kg counterweight system (13) to assist the user in raising the pole. The electrical and water sprinkler system runs in serial, all perimeter enclosures (2).

[0052] The enclosure (2) of the poles is previously placed on the floor and held therein fixed. For its installation, a hole should be drilled in the ground with approximately 25 cm in diameter and 2 m deep. In this bore the enclosure (2) of the pole (1) is placed and after the electrical and water connections and the installation of the components of the enclosure, the pole (1) is installed.

#### Poles

[0053] Each pole (1) has the approximate shape of a hollow cylinder, but can also be parallelepiped, with a diameter of approximately 20cm. It is made of aluminum, then coated with a layer which can withstand high temperatures and is resistant to moisture and corrosion. The method of manufacture will involve embossing and extrusion. The thickness of the plate should be around 2 or 3 mm in the most critical areas and the total weight of the structure should be around 22 kg. The pole (1) will have inside it the roll of the fire-resistant screen (3). Each roll will have a weight approximately 50kg, resulting in a total weight of the pole (1) of approximately 72kg. This roll will rotate on a central rod inside the pole.

[0054] The pole (1) will have a side opening through which the screen comes out. On the opposite side to this aperture is a recess where the prior pole screen is secured. That recess has specific locations and is evidenced by a painting that shines in the dark and is reflective, where the magnets of the screen bar are fixed.

[0055] At the top of the pole (1) there is a section having a set of temperature sensors, humidity, wind speed, gravitational acceleration, GPS, 3GPRS, and a set of warning mechanisms, including a siren and High-brightness multicolor LEDs.

[0056] Each pole (1) has no batteries but is powered by batteries in the inside the enclosure (2) of the pole. The electrical connection is made when the pole (1) is fully raised and the stabilizer bars are engaged.

#### Fire-proof screen (3)

[0057] The material to be used in this fireproof screen will be a kind of fiberglass, including a variety of variants, including those that are rich in silicon dioxide.

[0058] What is important is that its melting point is greater than 1700 degrees Celsius, and that it can withstand temperatures of about 900 degrees Celsius, for a long time without deteriorating.

[0059] The screen should also have the following characteristics: malleability similar to that of a common fabric, resistance to high temperatures, resistance to direct flame contact, low heat conductivity, thermal and electrical insulation properties and non-pollutant materials and characteristics.

[0060] These materials and components are known from the prior art. There are materials with similar characteristics that may be used in the present invention, some even with better performances than those who were referred above. The economic aspect of the project should be taken into account when choosing the alternatives.

[0061] The screen can contain a conductive fabric strip, which will assess the screen integrity during the fire. If the screen is destroyed, the electrical current is no longer conducted through this fabric strip, alerting the sensors of the poles.

[0062] This screen is rolled up and placed inside the poles to be extended. The screen will be 2m high, 50 meters long, and 0.5mm thick thickness. With an approximate weight of 500g per square meter. The resulting screen roll inside the pole (1) will be approximately 50kg and have a diameter of 180mm.

[0063] One end of the screen will be attached to the inner center pole of the pole. This will rotate and will have a spring that will pull the screen, to wind it up, helping to keep it stretched, when extended. At the other end, you will have a metal bar with three handles and magnets, so that the user can easily extend the screen and can attach it to the next pole (1). The location where the magnets are to be attached is properly marked on the pole (1), with a painting that shines in the dark and is reflective. When the magnets are successfully coupled to the pole (1) a sensor is triggered followed by the green light on top of the pole (1) indicating that the screen has been successfully mounted.

#### Claims

1. A fire-proof barrier pole (1), **characterized by** comprising a hollow shaft (20) which comprises a longitudinally extending groove, the hollow shaft (20) further containing a fire-proof screen (3) wound and withdrawn to the outside of the hollow shaft (20) through said groove, and further comprising a plurality of fastening means (18) arranged longitudinally on a surface of the hollow shaft (20), suitable for

attachment to receiving means (10) of an enclosure (2).

2. A pole (1) according to the preceding claim, **characterized by** in that the fire-proof screen (3) comprising:

- a fixing side arranged in such a way that - in unrolling the screen, the fixation side extends parallel to the central rod - this side comprising a plurality of coupling means for second pole (16), suitable for fixing the screen to a second pole (1) and

the hollow shaft (20) comprising:

- on its outer surface a plurality of reception means (10) of the coupling means for second pole screen (17) arranged longitudinally and diametrically opposed to said groove, suitable for securing the hollow shaft (20) to a second pole screen (1), and

the coupling means for second pole (16) and the receiving means (10) of coupling means for second pole screen (17) being preferably magnetic.

3. Pole (1) according to the previous claim **characterized by** additionally comprising a rigid rim (14), preferably a metallic bar, fixed and extending along the entire fixing side of the fire proof screen (3), and comprising said second pole coupling means (16), the rigid rim (14) comprising at least one cutout forming a handle (15), any of these cutouts being arranged adjacent to one of the coupling means for the second pole (16).

4. A pole (1) according to any one of the preceding claims, **characterized by** in that said hollow shaft (20) comprising, at its first top, a large diameter section, suitable for coupling to a section of larger diameter of a corresponding enclosure (2).

5. A pole (1) according to any one of claims 2-3, **characterized by** comprising a compartment (6) in said larger section (6) having transparency and comprising in its interior control electronics and:

- lighting means and / or  
- sound and

the control electronics being configured to operate for a pre-defined period of time the lighting means and / or the sound means according to the coupling status of pole (1) to a second pole (1) by means of:

- the coupling means for second pole (16) or  
- the receiving means (10) of coupling means

for the display screen of a second pole (17).

6. A pole (1) according to any one of previous claims, **characterized by** further comprising a handle means (4) arranged on said hollow shaft (20), and:

- a protruding section for locking (5) of the pole (1) in means corresponding to an enclosure, arranged between the first top of the hollow shaft (20) and the handle means (4) and

the handle means (4) being rotatable about the hollow shaft (20) between a first and a second position, and the protruding locking section (5) being integral with the handle means (4).

7. A pole (1) according to any one of previous claims, **characterized by** further comprising at least two orifices equally spaced apart (19) arranged on the outer surface of its second top, radially projecting towards the center of the pole (1), each suitable for receiving a corresponding male element (11) from the enclosure, the pole (1) preferably comprising four equally spaced holes (19).

8. Pole (1) according to any one of previous claims, **characterized by** comprising securing means (18) to the ground, preferably protruding elements adapted for fixation in dirt ground, optionally in stakes.

9. A tubular enclosure (2) for receiving a fire proof barrier pole (1) **characterized by** having a section having a larger diameter and another section with a smaller diameter and:

- the larger diameter section is arranged on a first top of the enclosure, being suitable for receiving and coupling a section of greater diameter of an fire proof barrier pole (1);  
- at least two receiving means (10) arranged inside the large diameter section of the first top, projecting radially to the inside the enclosure, and suitable for receiving fastening means (18) of an fire proof barrier pole (1).

10. Enclosure (2) according to the preceding claim, **characterized by** comprising at least two male elements (11) equally spaced apart on the inner surface of its second top and radially projecting, each being resilient and suitable for coupling in a bore of a fire proof barrier pole (1), the enclosure (2) comprising preferably four equally spaced male elements (11).

11. An enclosure (2) according to any one of claims 9-10, **characterized by** additionally comprising i) a plurality of resilient lifting elements (12) which are accommodated within the larger diameter of the first top and extending longitudinally and ii) preferably com-

prising a plurality of bearings (7) arranged longitudinally and along the inner surface of the enclosure, preferably in pairs.

12. An enclosure (2) according to any one of claims 9-11, **characterized by** further comprising a first chamber which surrounds the large diameter section, said first chamber comprising in its interior at least one tubing (8) arranged between two holes suitable for fixing the tubing (8) of the first chamber and, preferably:

- the first chamber comprising two pipes and two pairs of holes suitable for securing tubing (8);
- the receiving means (10) being constituted by a lock and a spring, the spring being secured in said first chamber and the means of receiving (10) extending into the first chamber and preferably, the two pipes are sequentially connected.

13. An enclosure (2) according to any one of claims 9-12 **characterized by** further comprising around its lower section a second chamber comprising in its interior a system of counterweights (13) with means suitable for attachment to a fire proof barrier pole (1).

14. An enclosure (2) according to any one of claims 9-13 **characterized by** comprising a plate arranged around the section of greater diameter.

15. Pole structure for fire proof barrier **characterized by** comprising the pole (1) of any one of claims 1-8 and the enclosure (2) of any of the claims 9-14, the pole (1) being arranged within the enclosure (2), and being retractable thereto by coupling the fastening means (18) to the receiving means (10).

16. Structure according to the preceding claim **characterized by** that said pole control electronics (1) is configured to activate the lighting means and / or the sound means for a predefined period of time, under the further condition that the handle means (4) of the pole (1) are rotated and the at least two equally spaced holes (19) engage the male elements (11) of the enclosure.

17. Pole structure for anti-fire barrier **characterized by** comprising:

- the pole (1) of any one of claims 1-7 and a vehicle (21) movable on the ground, on which said pole (1) is mounted, the robotic vehicle (21) containing locking means adapted to block its movement and preferably four-wheel drive, or
- the pole (1) of claim 8.

18. A fire proof tactical barrier **characterized by** comprising at least two:

- of the pole structures of any one of claims 15-16 or
- of the pole structures of claim 17,
- or combinations thereof,

each of the pole structures being at a maximum distance of at least another pole structure such that this maximum distance corresponds to the maximum extent of the fire proof screen (3) of at least one of these pole structures, and each of the enclosures (2) of the structures being buried in the ground, such that the respective pole (1) is withdrawable projecting above the ground.



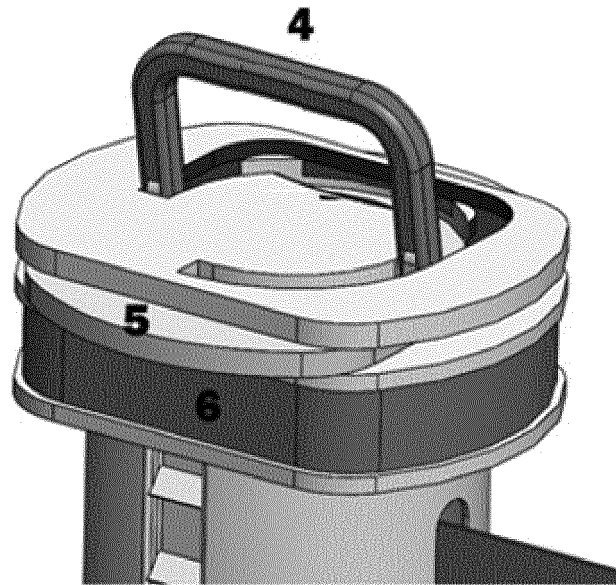


Figure 1

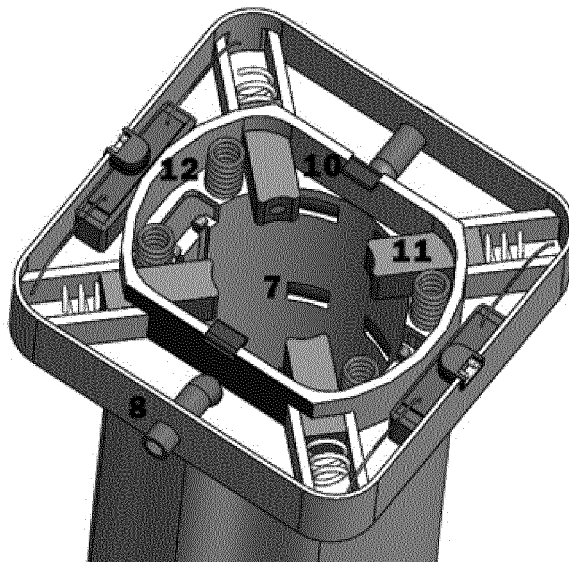


Figure 2

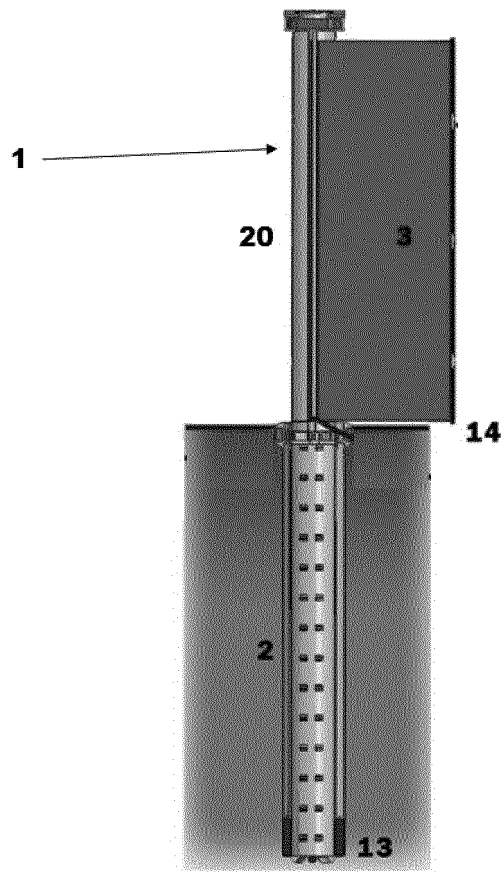


Figure 3

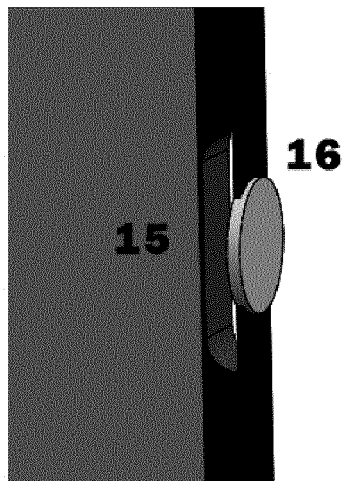


Figure 4

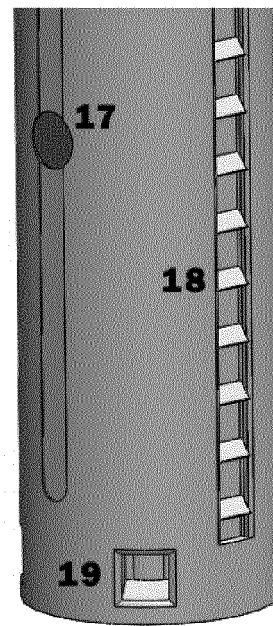


Figure 5

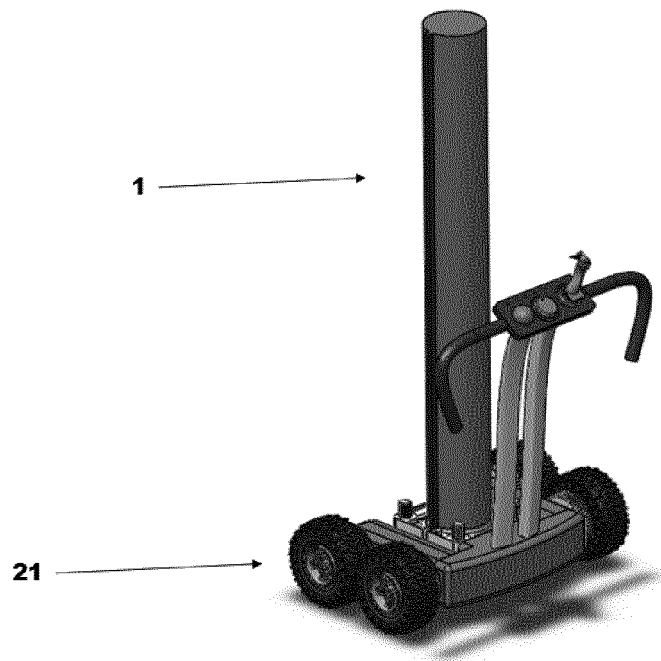


Figure 6

## INTERNATIONAL SEARCH REPORT

International application No  
PCT/IB2019/050740

A. CLASSIFICATION OF SUBJECT MATTER  
INV. A62C3/02  
ADD.

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)

A62C

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)

EP0-Internal, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages        | Relevant to claim No. |
|-----------|-------------------------------------------------------------------------------------------|-----------------------|
| A         | US 5 944 114 A (FARLEY BRENT L [US])<br>31 August 1999 (1999-08-31)<br>figure 18<br>----- | 1-18                  |



Further documents are listed in the continuation of Box C.



See patent family annex.

\* Special categories of cited documents :

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Date of the actual completion of the international search

6 May 2019

Date of mailing of the international search report

14/05/2019

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2019/050740

Patent document  
cited in search report

Publication  
date

Patent family  
member(s)

Publication  
date

US 5944114 A 31-08-1999 NONE

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- US 2010294520 A1 [0003]