

## 20 Documents

| Publication numbers | Title                                                                                                                            | Current assignees                                            |
|---------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|
| CN110053741 A       | Under-ice detection system based on capture remotely-operated <b>vehicle</b> (ROV) and suitable for ice hole laying and recovery | HANGZHOU DIANZI UNIVERSITY                                   |
| CN109018268 A       | A large-depth all-electric drive operation type <b>ROV</b> platform                                                              | CSSC SYSTEMS ENGINEERING RESEARCH INSTITUTE                  |
| CN208882086U U      | The invention discloses a large-depth all-electric drive operation type <b>ROV</b> platform                                      | CSSC SYSTEMS ENGINEERING RESEARCH INSTITUTE                  |
| EP1846288 A2        | Method and apparatus for deployment of ocean bottom seismometers                                                                 | MAGSEIS FF                                                   |
| EP3515807 A1        | <b>Underwater</b> pipeline inspection crawler                                                                                    | SAUDI ARABIAN OIL                                            |
| GB9706762 D0        | Method and apparatus for connecting <b>underwater</b> conduits                                                                   | SONSUB INTERNATIONAL                                         |
| WO2012156425 A2     | Autonomous <b>underwater</b> system for a 4d enviromental monitoring                                                             | ENI                                                          |
| CN207374622U U      | Restore <b>underwater</b> observation robot based on environment ecology                                                         | LIN XIAOJIN                                                  |
| EP3513142 A1        | Integrated ultrasonic testing and cathodic protection measurement probe                                                          | SAUDI ARABIAN OIL                                            |
| CN108442443 A       | <b>Underwater</b> hole dredging method and system based on <b>underwater</b> robot                                               | ZHEJIANG UNIVERSITY                                          |
| CN107914845 A       | <b>Underwater</b> unmanned aerial <b>vehicle</b> with fixed wings                                                                | ZHEJIANG UNIVERSITY                                          |
| CN110077562 A       | Swimming and traveling combined <b>underwater</b> monitoring robot                                                               | ZHEJIANG UNIVERSITY                                          |
| JP2005106655 A      | <b>Underwater</b> moving device                                                                                                  | HITACHI                                                      |
| CN109094758 A       | An <b>underwater vehicle</b> capable of monitor and emergency rescue                                                             | DONGGUAN QIQU ROBOT TECHNOLOGY                               |
| KR101224893 B1      | Emergency module for an <b>underwater</b> robot capable of quickly coping with emergency situations                              | KOREA INSTITUTE OF OCEAN SCIENCE & TECHNOLOGY                |
| US5947051 A         | <b>Underwater</b> self-propelled surface adhering robotically operated <b>vehicle</b>                                            | GEIGER; MICHAEL B.                                           |
| CN109591981 A       | <b>Underwater</b> detecting robot for marine engineering                                                                         | MESOTHERMIC RESEARCH INSTITUTE OF OCEANOGRAPHY & AGRICULTURE |
| CN110239694 A       | Ocean communication <b>remote</b> control submersible                                                                            | TAIZHOU KEPUNI COMMUNICATION EQUIPMENT                       |

| Publication numbers            | Title                                                                 | Current assignees                          |
|--------------------------------|-----------------------------------------------------------------------|--------------------------------------------|
| <a href="#">EP1434479 A1</a>   | Method and apparatus for <b>underwater</b> tree cutting and retrieval | TRITON RESOURCES                           |
| <a href="#">CN207826508U U</a> | Small -size have cable <b>underwater vehicle</b> under water          | HANGZHOU SITU<br>INTELLIGENT<br>TECHNOLOGY |

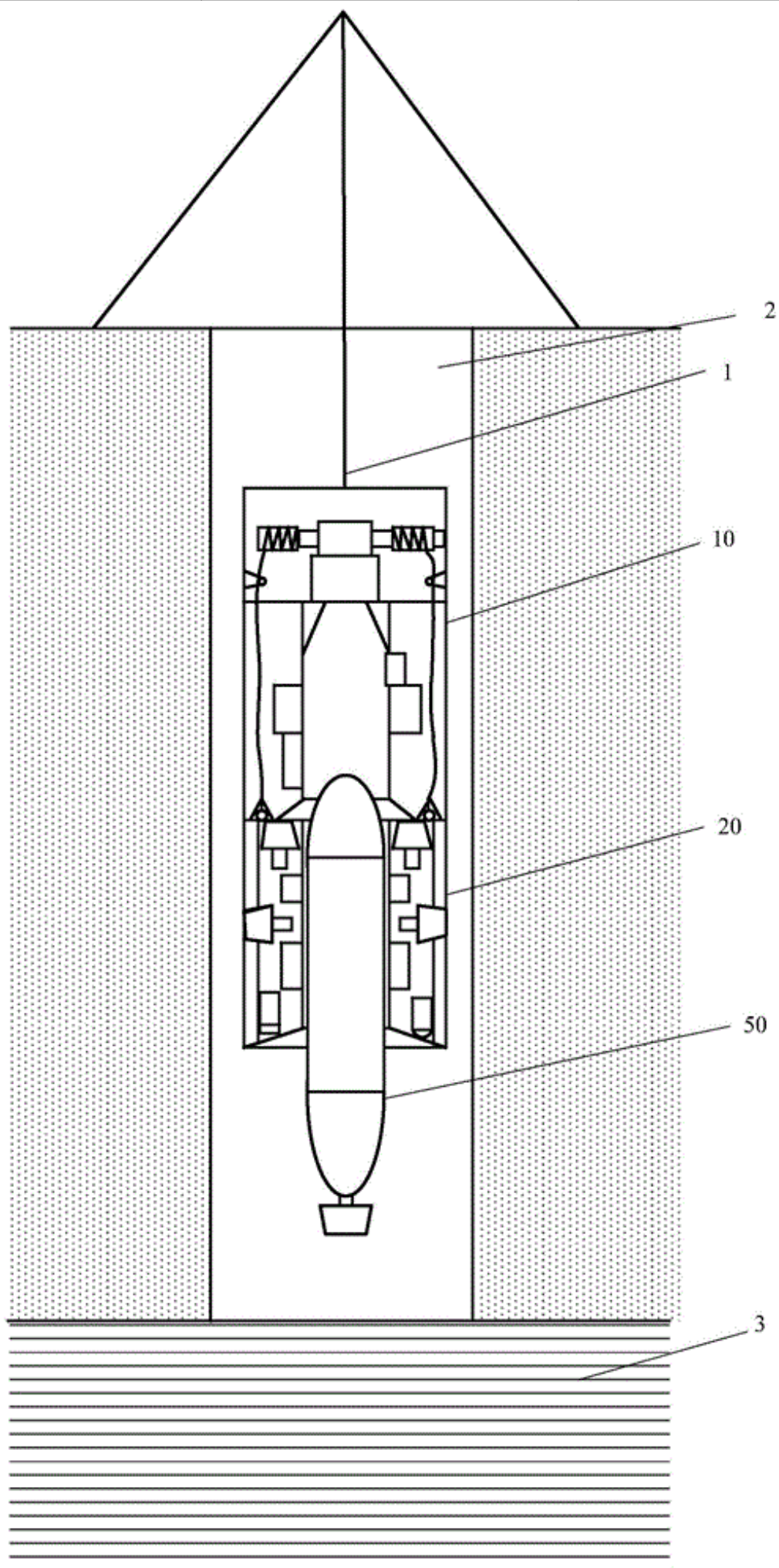
Family 1/20 - FAMPAT - ©Questel

**Title**

(CN110053741)

Under-ice detection system based on capture remotely-operated vehicle (ROV) and suitable for ice hole laying and recovery

**Images**



**Publication numbers with kind code & date**

CN110053741

A

2019-07-26

CN110053741

**Abstract**

(CN110053741)

The invention discloses an under-ice detection system based on a capture remotely-operated **vehicle (ROV)** and suitable for ice hole laying and recovery. The under-ice detection system can enter water through an ice hole with the limited hole diameter, and comprises a load-bearing cable, a connecting bin, the capture **ROV** and an under-ice detection autonomous **underwater vehicle** (AUV); the load-bearing cable is used for being hung in the ice hole to lift upwards and lower the under-ice detection system; the connecting bin is fixedly connected with the load-bearing cable driving the connecting bin to move, and used for **underwater** collecting and expanding of the capture **ROV** and charging endurance and data communication of the under-ice detection AUV; the capture **ROV** is connected with the connecting bin to be combined into a cylindrical overall structure capable of moving in the ice hole with the limited hole diameter, and can be disengaged from the connecting bin **underwater** to collect a water sample or sediment and connect the under-ice detection AUV; and the under-ice detection AUV is used for being disengaged from the capture **ROV underwater** to conduct **underwater** detection or being connected and fixed into the capture **ROV** to be movably recovered into the connecting bin along with the capture **ROV** for charging endurance and data communication. The under-ice detection system does not collide with the wall face of the ice hole, thus parts are not damaged, the detection time of the system under ice is prolonged, the detection range of the system under the ice is enlarged, and the detection efficiency is improved.

**Inventors**

PENG SHILIN

CAI WENYU

YU HAIBIN

SHI JIANGUANG

LIU JINGBIAO

**Latest standardized assignees - inventors removed**

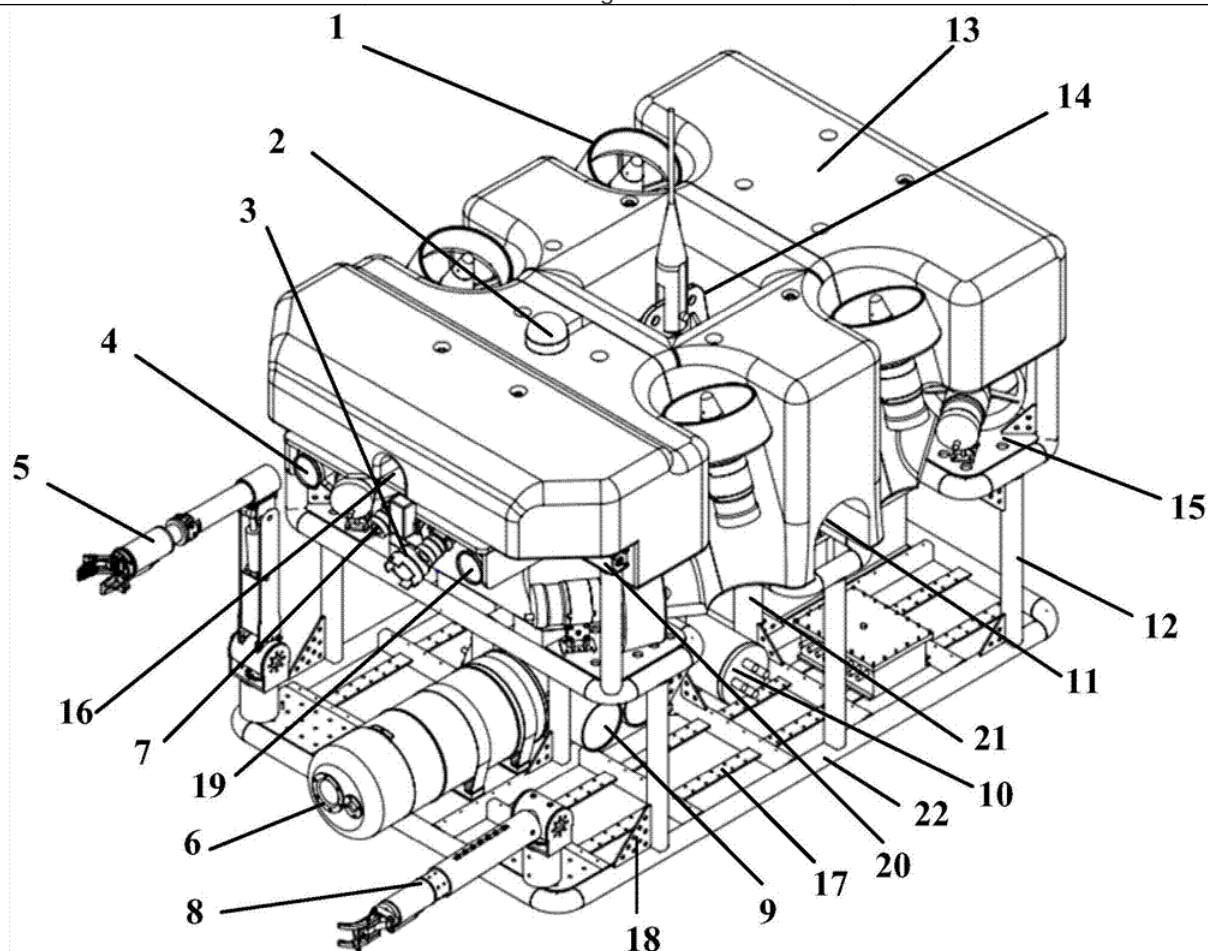
HANGZHOU DIANZI UNIVERSITY

Family 2/20 - FAMPAT - ©Questel

**Title**

(CN109018268)

A large-depth all-electric drive operation type **ROV** platform**Images**

**Publication numbers with kind code & date**[CN109018268](#)

A

2018-12-18

CN109018268

**Abstract**

(CN109018268)

The invention discloses a large-depth all-electric driving operation type **ROV** platform, comprising a main frame structure, a power propulsion device fixed on the main frame structure, a pan head **camera**, a high-definition **camera**, a dimming LED, a functional robot arm I, a laser imaging device, an LED lamp, a functional robot arm II, a hydraulic power unit cabin, a drive unit pressure-resistant cabin, a main pressure-resistant cabin, a buoyancy mechanism, a conventional **camera** and a focusing **camera**; The main frame structure comprises a main frame load-bearing longitudinal pipe, a main frame hanging device, an equipment mounting plate, a base guard strip, a stiffening rib plate, a main frame square **groove**, a main frame center bracket and a main frame load-bearing horizontal pipe. The invention can be used for horizontal motion and rotational motion of an **underwater vehicle**, and the motion control of the **underwater vehicle** is realized.

**Inventors**

LIU XING

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**Latest standardized assignees - inventors removed**

CSSC SYSTEMS ENGINEERING RESEARCH INSTITUTE

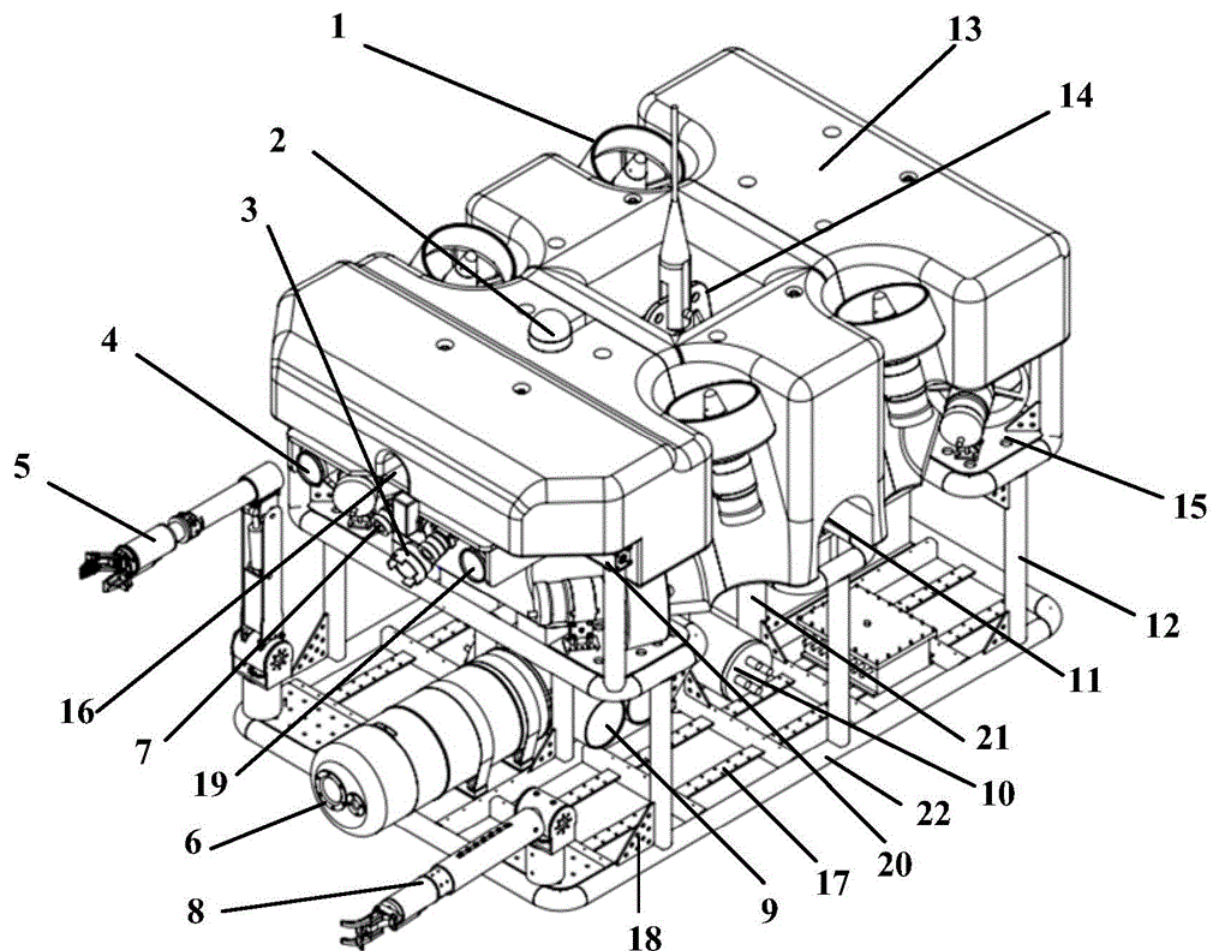
Family 3/20 - FAMPAT - ©Questel

**Title**

(CN208882086U)

The invention discloses a large-depth all-electric drive operation type **ROV** platform

## Images



## Publication numbers with kind code & date

[CN208882086](#)

U

2019-05-21

CN208882086U



## Abstract

(CN208882086)

The utility model discloses a large-depth all-electric drive operation type **ROV** platform. The system comprises a main frame structure, and a power propulsion device, a pan-tilt-zoom **camera**, a high-definition **camera**, a dimming LED, a functional mechanical arm I, laser imaging equipment, an LED lamp, a functional mechanical arm II, a hydraulic power unit cabin, a driving unit pressure-resistant cabin, a main control pressure-resistant cabin, a buoyancy mechanism, a conventional **camera** and a fixed-focus **camera** which are fixed on the main frame structure; The main frame structure comprises main frame bearing longitudinal pipes, main frame hanging devices, equipment mounting plates, base protection strips, reinforcing rib plates, main frame square grooves, a main frame center support and main frame bearing transverse pipes. The device can be used for horizontal movement, rotary movement and the like of the **underwater** robot, and movement control over the **underwater** robot is achieved.

## Inventors

LIU XING

LIU YIBO

HUANG AIGEN

SONG JIAPING

WAN HAIQIN

CHEN JIANPING

DING PENGFU

## Latest standardized assignees - inventors removed

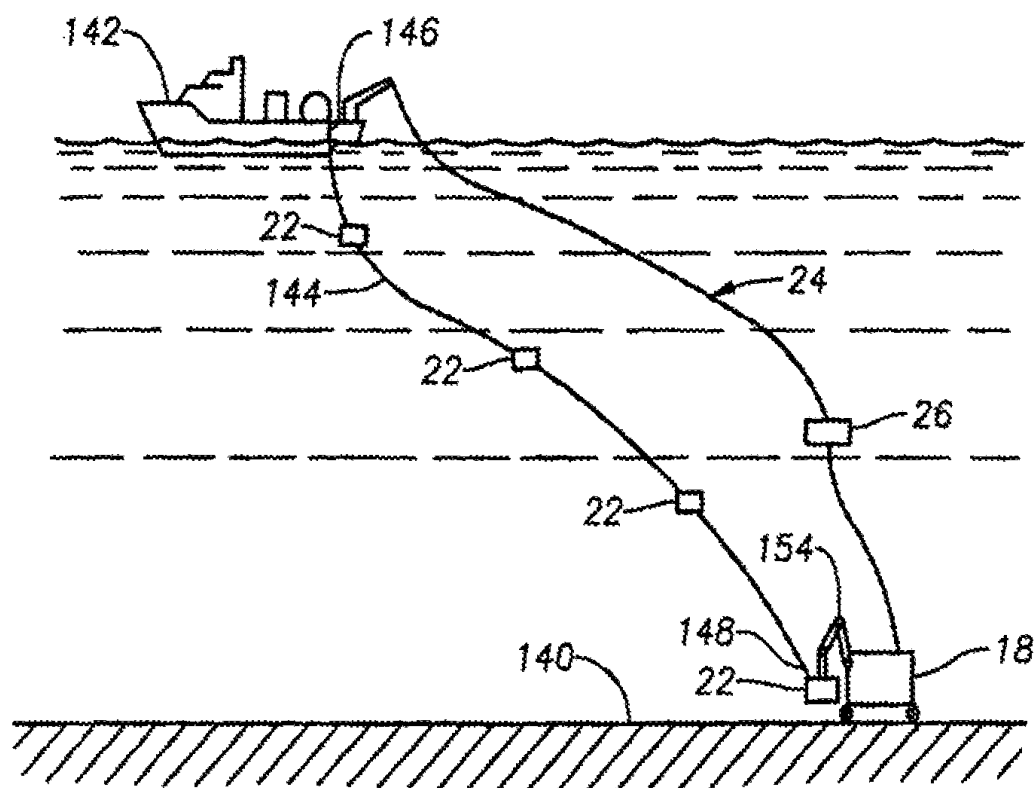
CSSC SYSTEMS ENGINEERING RESEARCH INSTITUTE

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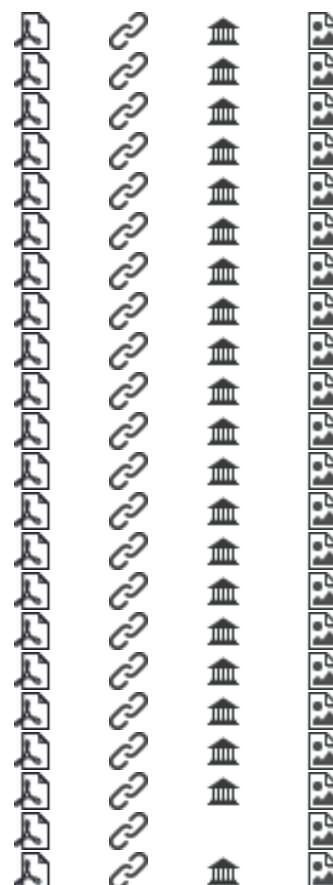
**Title**

(EP1846288)

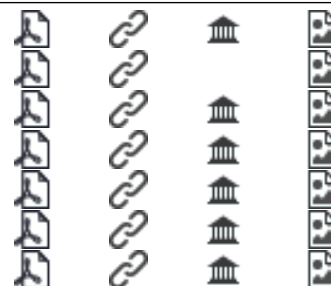
Method and apparatus for deployment of ocean bottom seismometers

**Images****Publication numbers with kind code & date**

|               |    |            |               |
|---------------|----|------------|---------------|
| US10598808    | B2 | 2020-03-24 | US10598808    |
| US10591624    | B2 | 2020-03-17 | US10591624    |
| US10502853    | B2 | 2019-12-10 | US10502853    |
| US20170299749 | A1 | 2017-10-19 | US20170299749 |
| US20170212261 | A1 | 2017-07-27 | US20170212261 |
| US9630691     | B2 | 2017-04-25 | US9630691     |
| US20140186122 | A1 | 2014-07-03 | US20140186122 |
| US20140186123 | A1 | 2014-07-03 | US20140186123 |
| US8705314     | B2 | 2014-04-22 | US8705314     |
| ES2450930     | T3 | 2014-03-25 | ES2450930     |
| DK1846288     | T3 | 2014-02-24 | DK1846288T    |
| US8632274     | B2 | 2014-01-21 | US8632274     |
| EP1846288     | B1 | 2013-12-11 | EP1846288     |
| US8556540     | B2 | 2013-10-15 | US8556540     |
| US8534959     | B2 | 2013-09-17 | US8534959     |
| US20120087206 | A1 | 2012-04-12 | US20120087206 |
| US20120087208 | A1 | 2012-04-12 | US20120087208 |
| US8075226     | B2 | 2011-12-13 | US8075226     |
| US20110286800 | A1 | 2011-11-24 | US20110286800 |
| EP1846288     | A4 | 2010-07-07 | EP1846288     |
| RU2007131268  | A  | 2009-02-27 | RU2007131268  |
| CN101365964   | A  | 2009-02-11 | CN101365964   |



|                               |    |            |               |
|-------------------------------|----|------------|---------------|
| <a href="#">WO2006/078644</a> | A3 | 2008-10-30 | WO200678644   |
| <a href="#">MX2007008695</a>  | A  | 2008-03-18 | MX2007008695  |
| <a href="#">US20070258774</a> | A1 | 2007-11-08 | US20070258774 |
| <a href="#">EP1846288</a>     | A2 | 2007-10-24 | EP1846288     |
| <a href="#">CA2595185</a>     | A1 | 2006-07-27 | CA2595185     |
| <a href="#">WO2006/078644</a> | A2 | 2006-07-27 | WO200678644   |
| <a href="#">US20060159524</a> | A1 | 2006-07-20 | US20060159524 |

**Abstract**

(EP1846288)

A method and apparatus for deployment and retrieval of ocean bottom seismic receivers. In one embodiment the apparatus comprises a carrier containing a plurality of receivers attached to a remotely operated **vehicle (ROV)**. The carrier comprises a frame in which is mounted a structure for seating and releasing said receivers. The structure may comprise a movable carousel or a movable conveyor or fixed parallel rails or a barrel. In the case of the barrel the receivers are axially stacked therein. The structure is disposed to deliver said receivers to a discharge port on said frame where the receivers are removable from said carrier. The apparatus includes a discharge mechanism for removing said receivers from said carrier.

**Inventors**

THOMPSON JAMES N

RAY CLIFFORD H

FISSELER GLENN D

FYFFE ROGER L

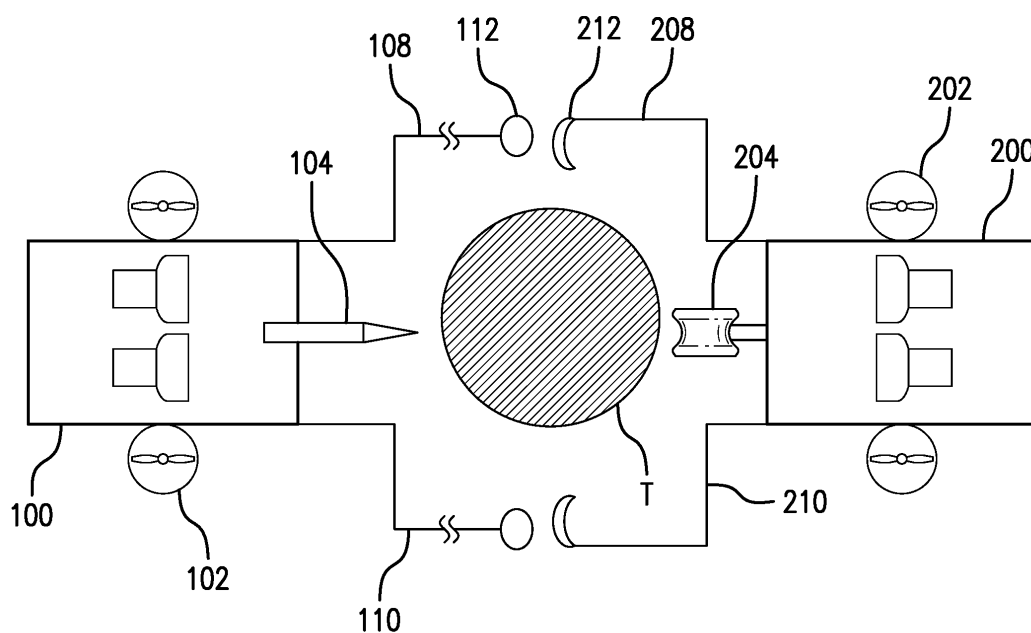
**Latest standardized assignees - inventors removed**

MAGSEIS FF

Family 5/20 - FAMPAT - ©Questel

**Title**

(EP3515807)

**Underwater** pipeline inspection crawler**Images****Publication numbers with kind code & date**[US10589432](#)

B2 2020-03-17

US10589432



|                   |    |            |                |                                                                                       |                                                                                       |                                                                                       |                                                                                       |
|-------------------|----|------------|----------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| US10589433        | B2 | 2020-03-17 | US10589433     |     |     |     |     |
| JP2019536676      | A  | 2019-12-19 | JP2019536676   |    |    |    |    |
| US20190344452     | A1 | 2019-11-14 | US20190344452  |    |    |    |    |
| JP2019531962      | A  | 2019-11-07 | JP2019531962   |    |    |    |    |
| US10456924        | B2 | 2019-10-29 | US10456924     |    |    |    |    |
| JP2019529211      | A  | 2019-10-17 | JP2019529211   |    |    |    |    |
| JP2019529227      | A  | 2019-10-17 | JP2019529227   |    |    |    |    |
| CN110167838       | A  | 2019-08-23 | CN110167838    |    |    |    |    |
| US10369705        | B2 | 2019-08-06 | US10369705     |    |    |    |    |
| EP3515807         | A1 | 2019-07-31 | EP3515807      |    |    |    |    |
| EP3515809         | A1 | 2019-07-31 | EP3515809      |    |    |    |    |
| EP3516280         | A1 | 2019-07-31 | EP3516280      |    |    |    |    |
| EP3516281         | A2 | 2019-07-31 | EP3516281      |    |    |    |    |
| KR10-2019-0062434 | A  | 2019-06-05 | KR20190062434  |    |    |                                                                                       |    |
| KR10-2019-0057332 | A  | 2019-05-28 | KR20190057332  |    |    |                                                                                       |    |
| KR10-2019-0053197 | A  | 2019-05-17 | KR20190053197  |    |    |                                                                                       |    |
| KR10-2019-0051025 | A  | 2019-05-14 | KR20190051025  |    |    |                                                                                       |    |
| CN109715490       | A  | 2019-05-03 | CN109715490    |    |    |    |    |
| CN109716004       | A  | 2019-05-03 | CN109716004    |  |  |  |  |
| CN109716005       | A  | 2019-05-03 | CN109716005    |  |  |  |  |
| US20190111572     | A1 | 2019-04-18 | US20190111572  |  |  |  |  |
| SG11201901780X    | A  | 2019-03-28 | SG11201901780X |  |  |                                                                                       |  |
| US20190084163     | A1 | 2019-03-21 | US20190084163  |  |  |  |  |
| US20190039251     | A1 | 2019-02-07 | US20190039251  |  |  |  |  |
| US10183400        | B2 | 2019-01-22 | US10183400     |  |  |  |  |
| US10131057        | B2 | 2018-11-20 | US10131057     |  |  |  |  |
| US10124494        | B2 | 2018-11-13 | US10124494     |  |  |  |  |
| WO2018/057452     | A3 | 2018-05-31 | WO201857452    |  |  |  |  |
| WO2018/057250     | A1 | 2018-03-29 | WO201857250    |  |  |  |  |
| WO2018/057344     | A1 | 2018-03-29 | WO201857344    |  |  |  |  |
| WO2018/057452     | A2 | 2018-03-29 | WO201857452    |  |  |  |  |
| WO2018/057589     | A1 | 2018-03-29 | WO201857589    |  |  |  |  |
| US20180079086     | A1 | 2018-03-22 | US20180079086  |  |  |  |  |
| US20180079475     | A1 | 2018-03-22 | US20180079475  |  |  |  |  |
| US20180080307     | A1 | 2018-03-22 | US20180080307  |  |  |  |  |
| US20180080904     | A1 | 2018-03-22 | US20180080904  |  |  |  |  |
| US20180080905     | A1 | 2018-03-22 | US20180080905  |  |  |  |  |

## Abstract

(EP3515807)

A system for **underwater** inspection including an inspection crawler (702) is provided wherein the inspection crawler (702) includes a housing (704) having first and second sides, a power source, a controller, an inspection tool, at least two pairs of driving wheels, and a moveable center of gravity, and a method for traversing a weld joint with the inspection crawler having a moving mass 734), wherein the crawler is parked proximate to the joint (138), and the mass is slid along a slide rail (736) to the second end of the crawler distal to the joint. The first end of the crawler is then propelled over the joint and the mass is slid to the center of the crawler. A center portion of the crawler is then propelled over the joint and the mass is slid to the first end of the crawler. The second end of the crawler is then propelled over the joint.

## Inventors

AL NAHWI AMMAR

ABDELLATIF FADL

OUTA ALI

AL-TAIE IHSAN

## Latest standardized assignees - inventors removed

SAUDI ARABIAN OIL

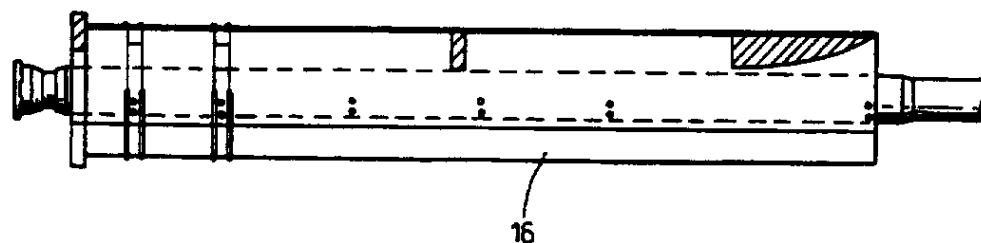
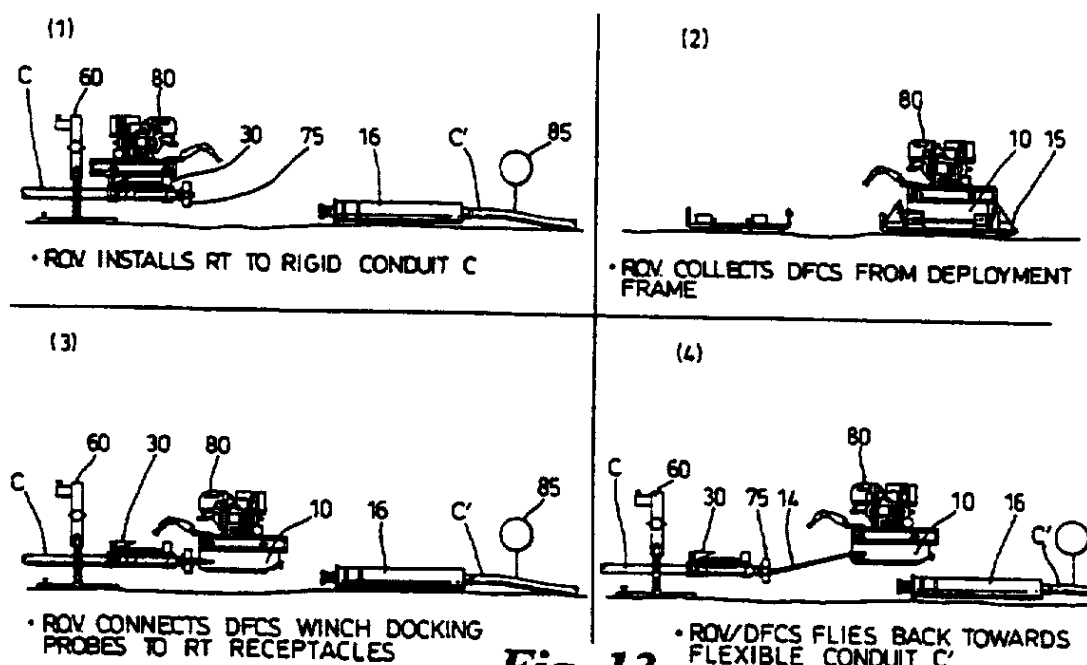
Family 6/20 - FAMPAT - ©Questel

## Title

(GB9706762)

Method and apparatus for connecting **underwater** conduits

## Images

**Fig. 3****Fig. 13**

## Publication numbers with kind code &amp; date

|           |    |            |           |
|-----------|----|------------|-----------|
| GB2323907 | B  | 2001-10-03 | GB2323907 |
| GB2323907 | A  | 1998-10-07 | GB2323907 |
| GB9807230 | D0 | 1998-06-03 | GB9807230 |
| GB9706762 | D0 | 1997-05-21 | GB9706762 |



## Abstract

(GB9706762)

**Underwater** conduits (C) are connected by remotely operated devices including a **vehicle** 80 capable of **underwater** excursions (**ROV**), and apparatus for connecting conduits 10, by a method controlled e.g. from a support vessel on the surface, comprising launching the **ROV** and connection apparatus 10, manipulating the **ROV** 80 to dock with the connecting apparatus; installing the connection apparatus at one of the conduits c; activating a docking clamp means using the **ROV** to capture the end of the other conduit C'; activating the connection apparatus to draw the second conduit to the first; connecting the two conduits together to form a continuous flowline; providing a sealed connection and recovering the **ROV** and connection apparatus to the support vessel.

(From GB2323907 A)

**Inventors**

CORBETTA GIOVANNI

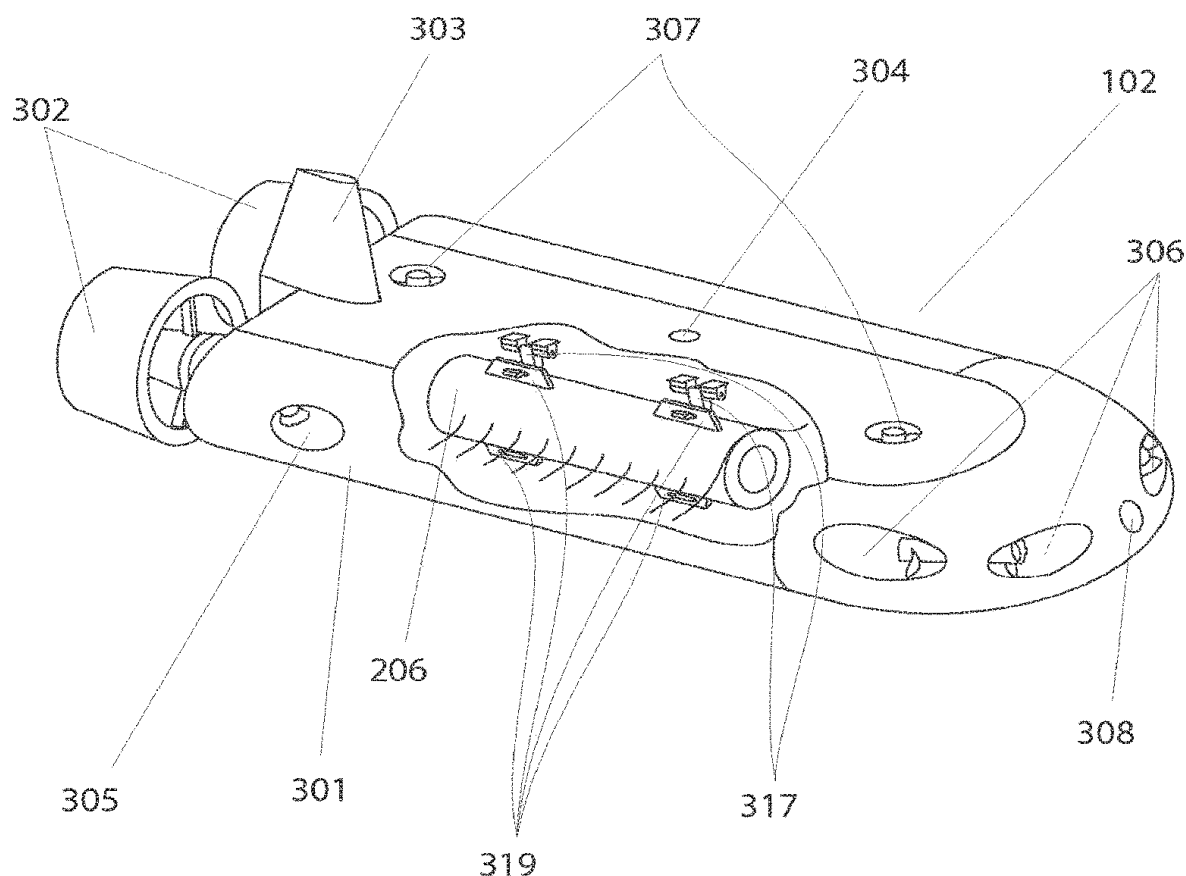
**Latest standardized assignees - inventors removed**

SONSUB INTERNATIONAL

Family 7/20 - FAMPAT - ©Questel

**Title**

(WO2012156425)

Autonomous **underwater** system for a 4d enviromental monitoring**Images****Publication numbers with kind code & date**

|                                   |    |            |                |
|-----------------------------------|----|------------|----------------|
| <a href="#">US10611447</a>        | B2 | 2020-04-07 | US10611447     |
| <a href="#">IN201948018971</a>    | A  | 2019-10-18 | IN201948018971 |
| <a href="#">CN105752300</a>       | B  | 2019-03-05 | CN105752300B   |
| <a href="#">AU2016228263</a>      | B2 | 2018-04-19 | AU2016228263   |
| <a href="#">CN103796912</a>       | B  | 2018-01-02 | CN103796912B   |
| <a href="#">US20170240258</a>     | A1 | 2017-08-24 | US20170240258  |
| <a href="#">US9718524</a>         | B2 | 2017-08-01 | US9718524      |
| <a href="#">BR112013028875</a>    | A2 | 2017-01-31 | BR112013028875 |
| <a href="#">DK178747</a>          | B1 | 2016-12-19 | DK-178747      |
| <a href="#">AP3900</a>            | A  | 2016-11-17 | AP---3900      |
| <a href="#">AU2016228263</a>      | A1 | 2016-10-06 | AU2016228263   |
| <a href="#">AU2012257715</a>      | B2 | 2016-07-21 | AU2012257715   |
| <a href="#">CN105752300</a>       | A  | 2016-07-13 | CN105752300    |
| <a href="#">RU2590800</a>         | C2 | 2016-07-10 | RU2590800      |
| <a href="#">AP201609286</a>       | A0 | 2016-06-30 | AP201609286    |
| <a href="#">RU2013153205</a>      | A  | 2015-06-27 | RU2013153205   |
| <a href="#">IN8928/CHENP/2013</a> | A  | 2014-12-12 | IN2013CN08928  |



|                   |    |            |                |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|-------------------|----|------------|----------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| IN8928/CHENP/2013 | A  | 2014-12-12 | IN2013CN08928  |   |   |   |   |
| US20140224167     | A1 | 2014-08-14 | US20140224167  |  |  |  |  |
| CN103796912       | A  | 2014-05-14 | CN103796912    |  |  |  |  |
| BR112013028875    | A1 | 2014-01-07 | BR112013028875 |  |  |  |  |
| AP201307305       | A0 | 2013-12-31 | AP201307305    |  |  |  |  |
| DK201370757       | A  | 2013-12-11 | DKPA201370757  |  |  |  |  |
| NO20131516        | A1 | 2013-11-29 | NO20131516     |  |  |  |  |
| AU2012257715      | A1 | 2013-11-21 | AU2012257715   |  |  |  |  |
| WO2012/156425     | A3 | 2013-05-10 | WO2012156425   |  |  |  |  |
| WO2012/156425     | A2 | 2012-11-22 | WO2012156425   |  |  |  |  |
| ITMI20110859      | A1 | 2012-11-18 | IT2011MI0859   |  |  |  |  |

**Abstract**

(WO2012/156425)

The autonomous **underwater** system for environmental monitoring (100) comprising a multidisciplinary **underwater** station (101) equipped with onboard instrumentation (202), at least one autonomous, modular **underwater vehicle** (102) movable inside an area to be monitored (107) along an assigned route 106 and at least one external instrumental modulus (206) which can be connected to said **vehicle** (102), wherein said multidisciplinary **underwater** station (101) comprises a docking area (204), an interface system (220), an equipping system (207) for supplying the **vehicle** (102) with instrumental moduli (206) and a management system (201).

**Inventors**

GASPARONI FRANCESCO

FAVARETTO MAURO

GRASSO TIBERIO

**Latest standardized assignees - inventors removed**

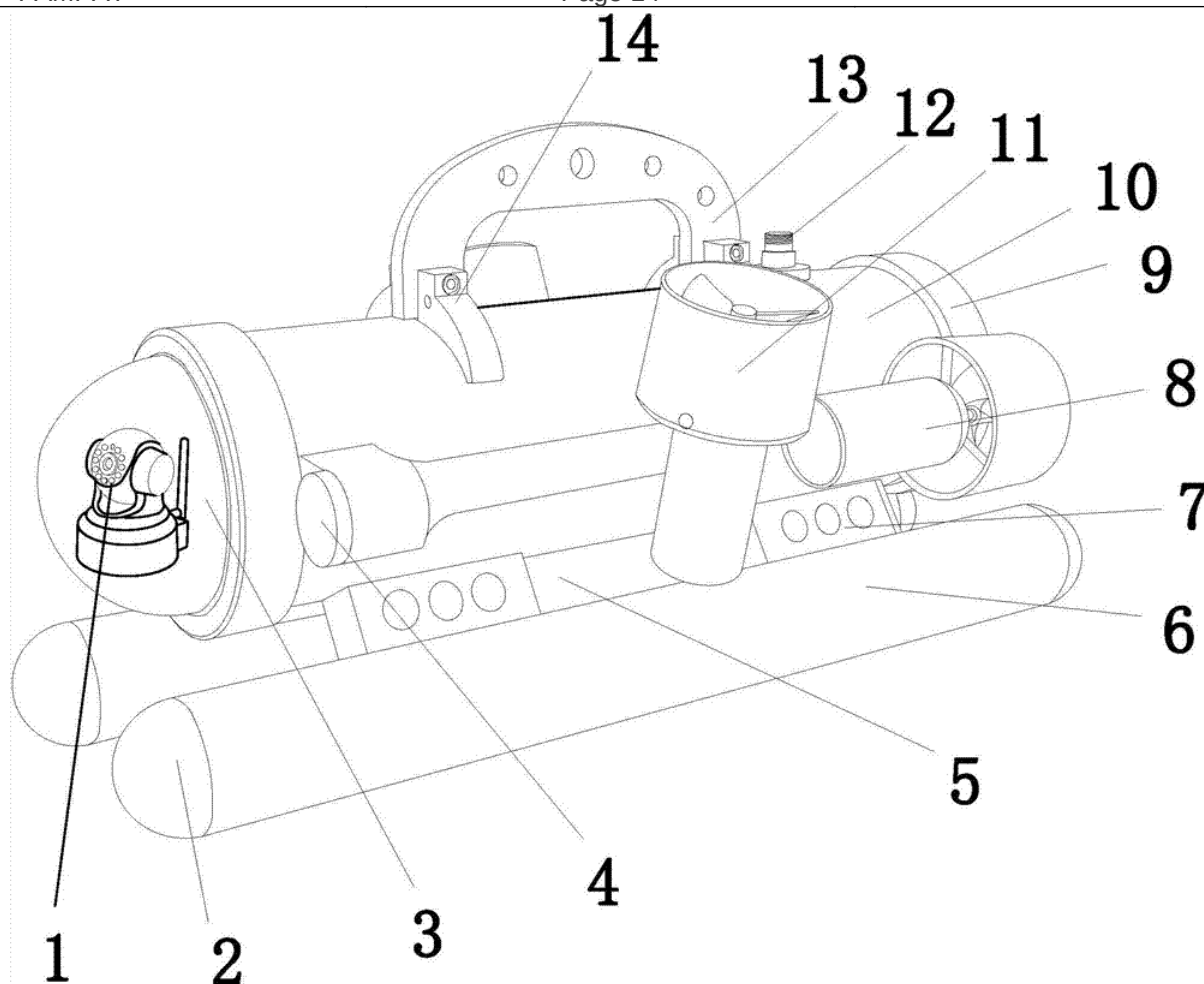
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Family 8/20 - FAMPAT - ©Questel

**Title**

(CN207374622U)

Restore **underwater** observation robot based on environment ecology**Images**



#### Publication numbers with kind code & date

[CN207374622](#)

U

2018-05-18

CN207374622U



#### Abstract

(CN207374622)

The utility model discloses a restore **underwater** observation robot based on environment ecology, its structure includes: pan head **camera**, the waterproof cap of battery compartment, withstand voltage cover, illumination fluorescent tube, level sensor, the battery compartment body, multirow water hole square **groove**, cross wise driver propeller, main barrel body waterproof ring, machine main barrel body, vertically propeller, watertight connector, portable palm, mechanical clamping piece under water, the utility model discloses pan head **camera** is equipped with infrared hotness and surveys the ball, transit machinery wheel, U type carrier frame plate, the data transmission antenna mast, the carrier frame plate chassis, integrated circuit block, transmission bearing wheel, the pan head **camera** base, realized that environment ecology repairs that the observation device of **underwater** observation robot is automatic to be studied for a second time courses one has flunked fuzzy picture and improve into high -definition image, observation device's internal circuit high accuracy cooperation obtains **remote** wireless transmission video recording video data's effect, make to survey the structure reach perfect and under the hydrous water robot survey environment ecology restore the condition.

#### Inventors

LIN XIAOJIN

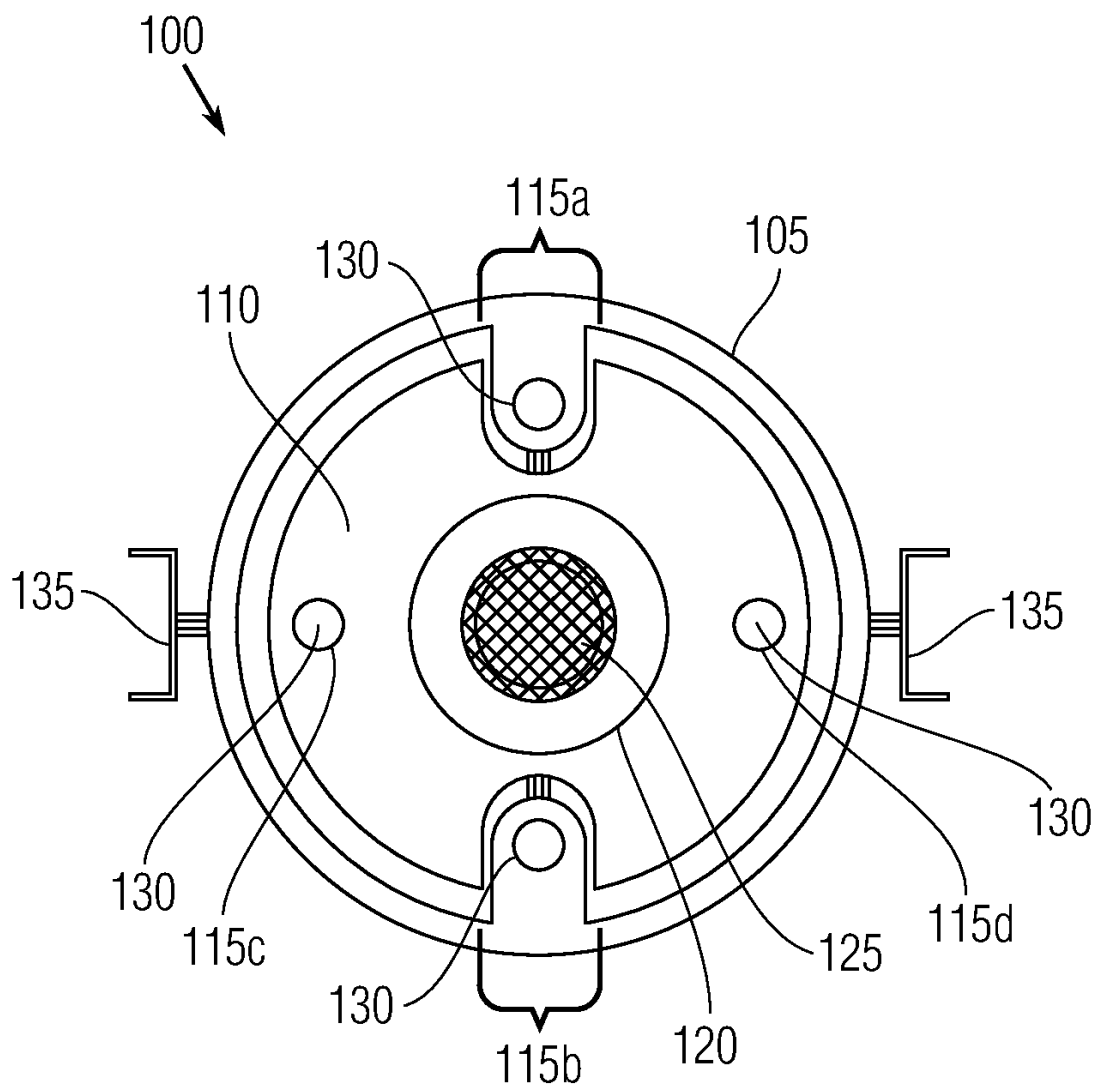
Family 9/20 - FAMPAT - ©Questel

#### Title

(EP3513142)

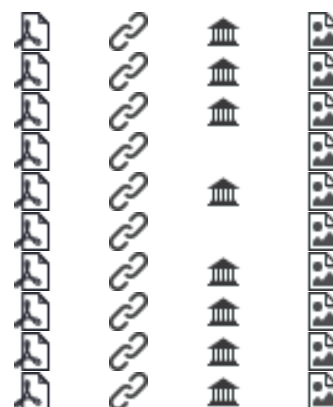
Integrated ultrasonic testing and cathodic protection measurement probe

#### Images



#### Publication numbers with kind code & date

|                                   |    |            |                                |
|-----------------------------------|----|------------|--------------------------------|
| <a href="#">US10551296</a>        | B2 | 2020-02-04 | <a href="#">US10551296</a>     |
| <a href="#">JP2019531477</a>      | A  | 2019-10-31 | <a href="#">JP2019531477</a>   |
| <a href="#">EP3513142</a>         | A1 | 2019-07-24 | <a href="#">EP3513142</a>      |
| <a href="#">KR10-2019-0046773</a> | A  | 2019-05-07 | <a href="#">KR20190046773</a>  |
| <a href="#">CN109564090</a>       | A  | 2019-04-02 | <a href="#">CN109564090</a>    |
| <a href="#">SG11201901008Q</a>    | A  | 2019-03-28 | <a href="#">SG11201901008Q</a> |
| <a href="#">US10234375</a>        | B2 | 2019-03-19 | <a href="#">US10234375</a>     |
| <a href="#">US20180372615</a>     | A1 | 2018-12-27 | <a href="#">US20180372615</a>  |
| <a href="#">WO2018/052488</a>     | A1 | 2018-03-22 | <a href="#">WO201852488</a>    |
| <a href="#">US20180073975</a>     | A1 | 2018-03-15 | <a href="#">US20180073975</a>  |



#### Abstract

(EP3513142)

This application discloses integrated probes and probe systems, which can be attached to the robotic arms of a remotely operated **vehicle** to perform both cathodic protection (CP) voltage measurements and ultrasonic testing (UT) thickness measurements at an **underwater** surface. In some embodiments, the integrated probe system couples an inner and outer gimbal together such that one or more electrically conductive legs pass from the outer gimbal through the inner gimbal. These legs are arranged about an ultrasonic sensor which extends from the front surface of the inner gimbal. When the integrated probe contacts the **underwater** surface, both the ultrasonic sensor and at least one leg contact the surface, thereby providing substantially simultaneous CP and UT measurements.

**Inventors**

ABDELLATIF FADL

AL-SAIARI HAMAD

OUTA ALI

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PATEL SAHEJAD

OBEDAN AMEEN

TRIGUI HASSANE

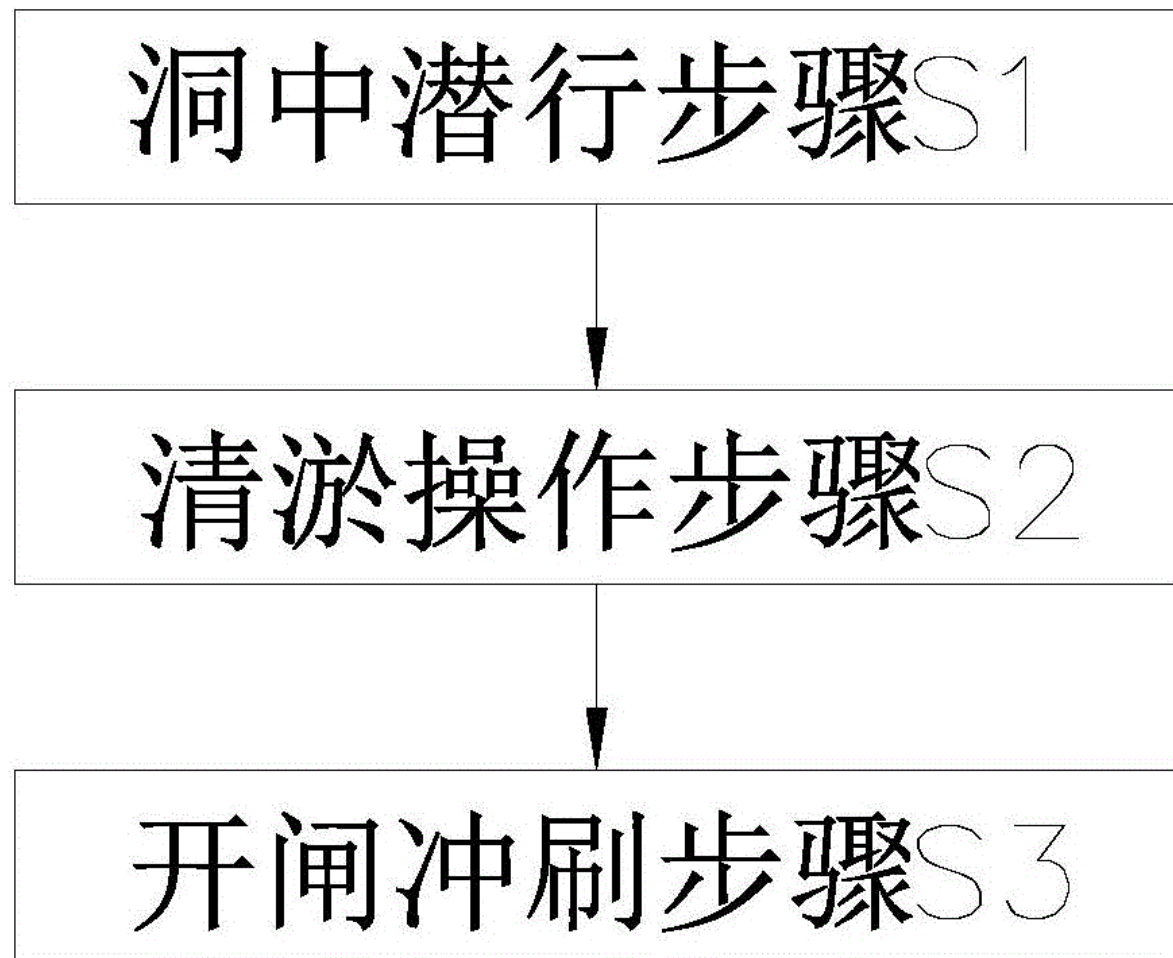
**Latest standardized assignees - inventors removed**

SAUDI ARABIAN OIL

Family 10/20 - FAMPAT - ©Questel

**Title**

(CN108442443)

**Underwater** hole dredging method and system based on **underwater** robot**Images****Publication numbers with kind code & date**

|                             |   |            |              |
|-----------------------------|---|------------|--------------|
| <a href="#">CN108442443</a> | B | 2019-11-19 | CN108442443B |
| <a href="#">CN108442443</a> | A | 2018-08-24 | CN108442443  |

**Abstract**

(CN108442443)

The invention relates to an **underwater** hole dredging method and system based on an **underwater** robot, and belongs to the technical field of **underwater** dredging. The **underwater** hole dredging method comprises the steps that (1) the **underwater** robot is controlled to move to a gate of an **underwater** hole by carrying with a hole operation device; (2) the **underwater** robot is controlled to place the hole operation device to a position beside the attaching position of a sediment

pile and the gate, then a dredging device is controlled to crush sediment at the attaching position, and at least part of crushed sediment is conveyed out of the **underwater** hole; and (3) the attaching position is dredged till the force for opening the gate is smaller than a preset value, and then the gate is controlled to be opened to flush the sediment pile with discharged water flow to achieve dredging. The **underwater** hole dredging method changes existing **underwater** hole dredging operation steps based on the underwater robot, so that the dredging workload of the dredging device in the **underwater** dredging process is reduced; and the **underwater** hole dredging method can be widely used for dredging **underwater** holes of reservoir dam culverts and the like.

**Inventors**

YANG CANJUN

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YANG WEI

CHANG ZHIXUAN

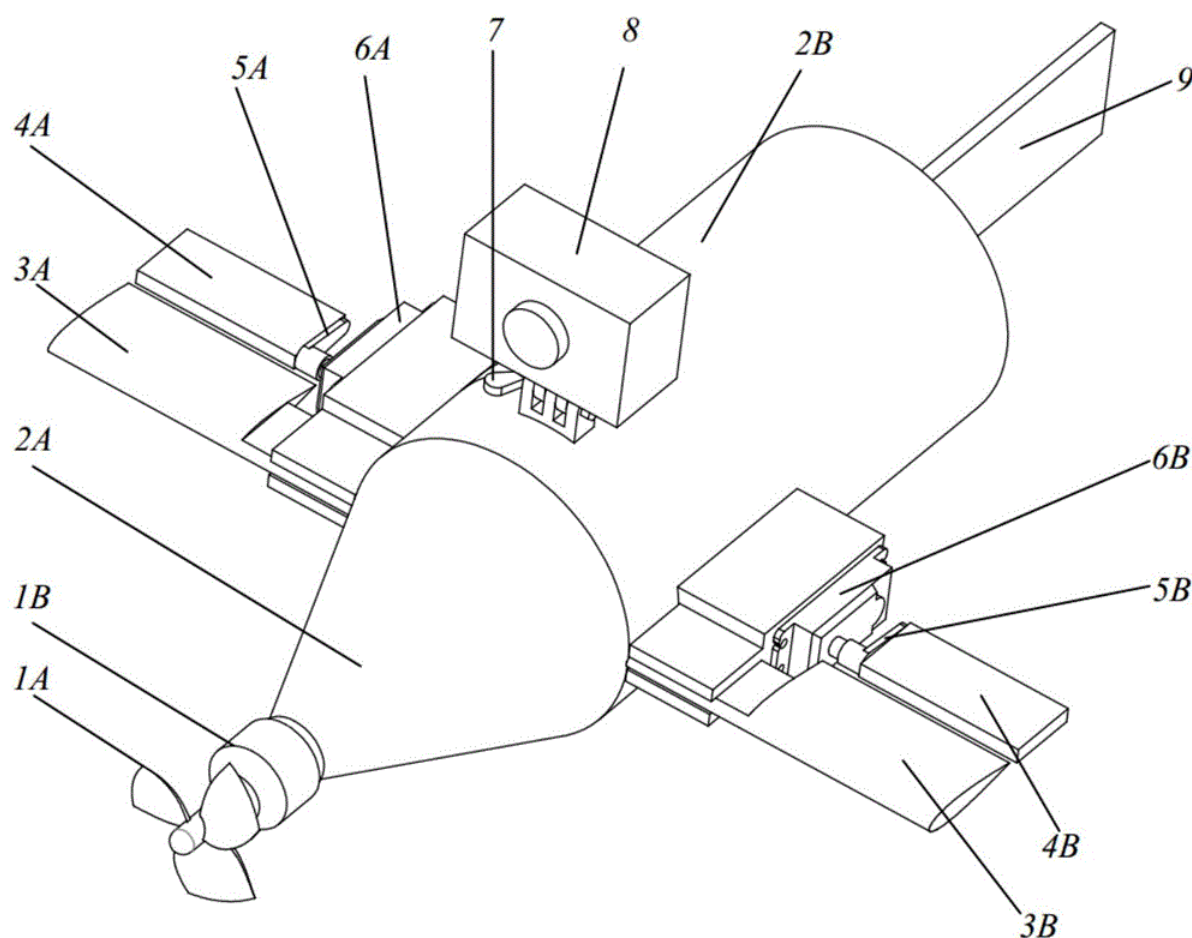
**Latest standardized assignees - inventors removed**

ZHEJIANG UNIVERSITY

Family 11/20 - FAMPAT - ©Questel

**Title**

(CN107914845)

**Underwater** unmanned aerial **vehicle** with fixed wings**Images****Publication numbers with kind code & date**

CN107914845

B

2020-04-17

CN107914845B

CN107914845

A

2018-04-17

CN107914845



**Abstract**

(CN107914845)

The invention relates to the technical field of **underwater** robots and aims to provide an **underwater** unmanned aerial **vehicle** with fixed wings. Propellers are mounted on a driving shaft of a brushless motor, and the brushless motor is fixed at the front end of a fuselage; lateral wings and wing flaps are respectively composed of components which are symmetrically arranged at two sides of the fuselage, and the wing flaps are positioned at the rear sides of the lateral wings, wherein the lateral wings include a left side wing and a right side wing which are respectively fixed on the side surfaces of the fuselage, the cross section of each lateral wing is in a drop shape, and the tail end of each lateral wing faces towards the direction of the tail of the fuselage; the wing flaps include a left wing flap and a right wing flap which are connected with a left steering engine and a right steering engine respectively through a left steering engine arm and a right steering engine arm, and the steering engines are fixed on the side surfaces of the fuselage; tail wings are connected with a rear steering engine through a rear steering engine arm, and the rear steering engine is fixed at the tail of the fuselage; and the connecting line of the propellers, the brushless motor and the tail wings is parallel to or coincident with the axis of the fuselage. The **underwater** unmanned aerial vehicle provided by the invention is small in size, light in weight, simple and convenient in operation and easy to control, has no need of other auxiliary devices, has definite purposes and use values, and is convenient to popularize, and the price is low.

**Inventors**

JI DAXIONG

REN JIE

SONG WEI

ZHU SHIQIANG

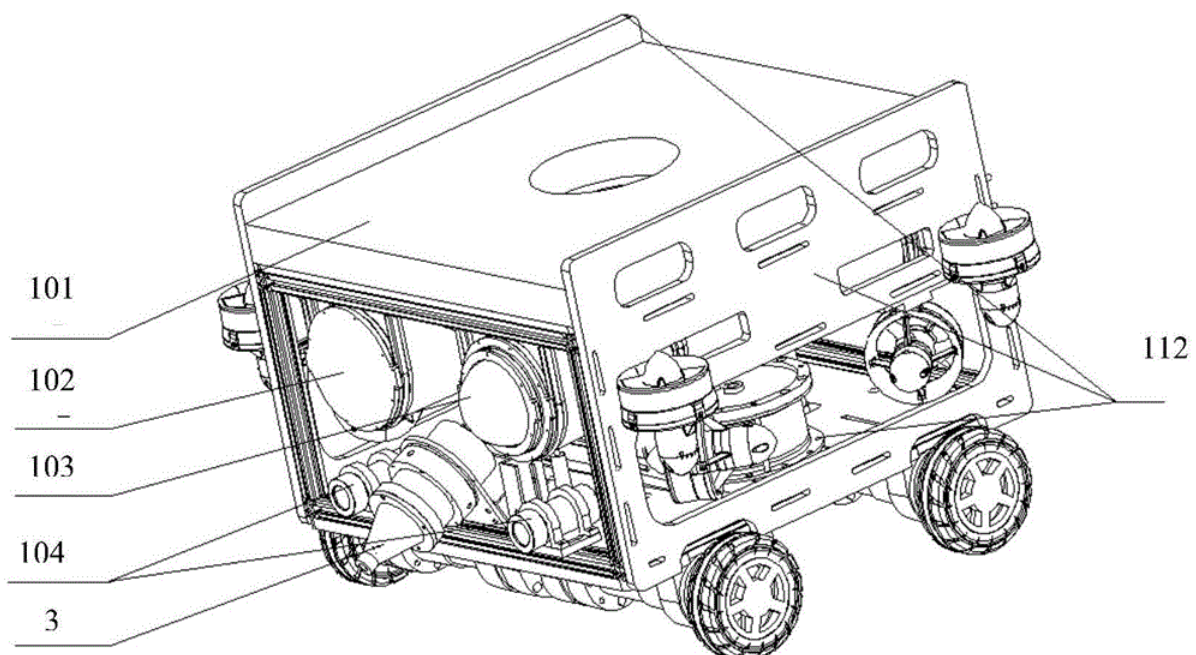
**Latest standardized assignees - inventors removed**

ZHEJIANG UNIVERSITY

Family 12/20 - FAMPAT - ©Questel

**Title**

(CN110077562)

Swimming and traveling combined **underwater** monitoring robot**Images****Publication numbers with kind code & date**[CN110077562](#)

A 2019-08-02

CN110077562

**Abstract**

(CN110077562)

The invention discloses a swimming and traveling combined **underwater** monitoring robot. The swimming and traveling combined **underwater** monitoring robot includes a **vehicle** body module, an ink jet tracking device module and an electronic control module, the **vehicle** module includes a **vehicle** body frame, a four-wheel-drive moving chassis, propellers and a centrifugal impeller **underwater** sucker, wherein the electronic control module is used for controlling swimming and traveling combined motion of the **underwater** robot and ink jet work of the ink jet tracking device module, the swimming function of the **underwater** robot is realized by the eight propellers, through the centrifugal impeller sucker and a brushless direct current planetary speed reducing motor, the function of crawling attaching to the wall of the **underwater** robot is realized, the functions of swimming and crawling attaching to the wall can be switched freely. According to the swimming and traveling combined **underwater** monitoring robot, the structure is compact, the size is small, the ability to move six degrees of freedom **underwater** can be realized, meanwhile, the functions of reliable adsorption and traveling on the wall surface at any angle can be realized by relying on a self-made adsorption device, thus the robot can rely on the adsorption device to travel on the wall surface when the dam surface is monitored, and the ability of crossing obstacles or quickly recovering of the robot is realized by relying on the propellers.

**Inventors**

LEI YONG

LUO TONG

TAO YIHANG

CHEN RUI

**Latest standardized assignees - inventors removed**

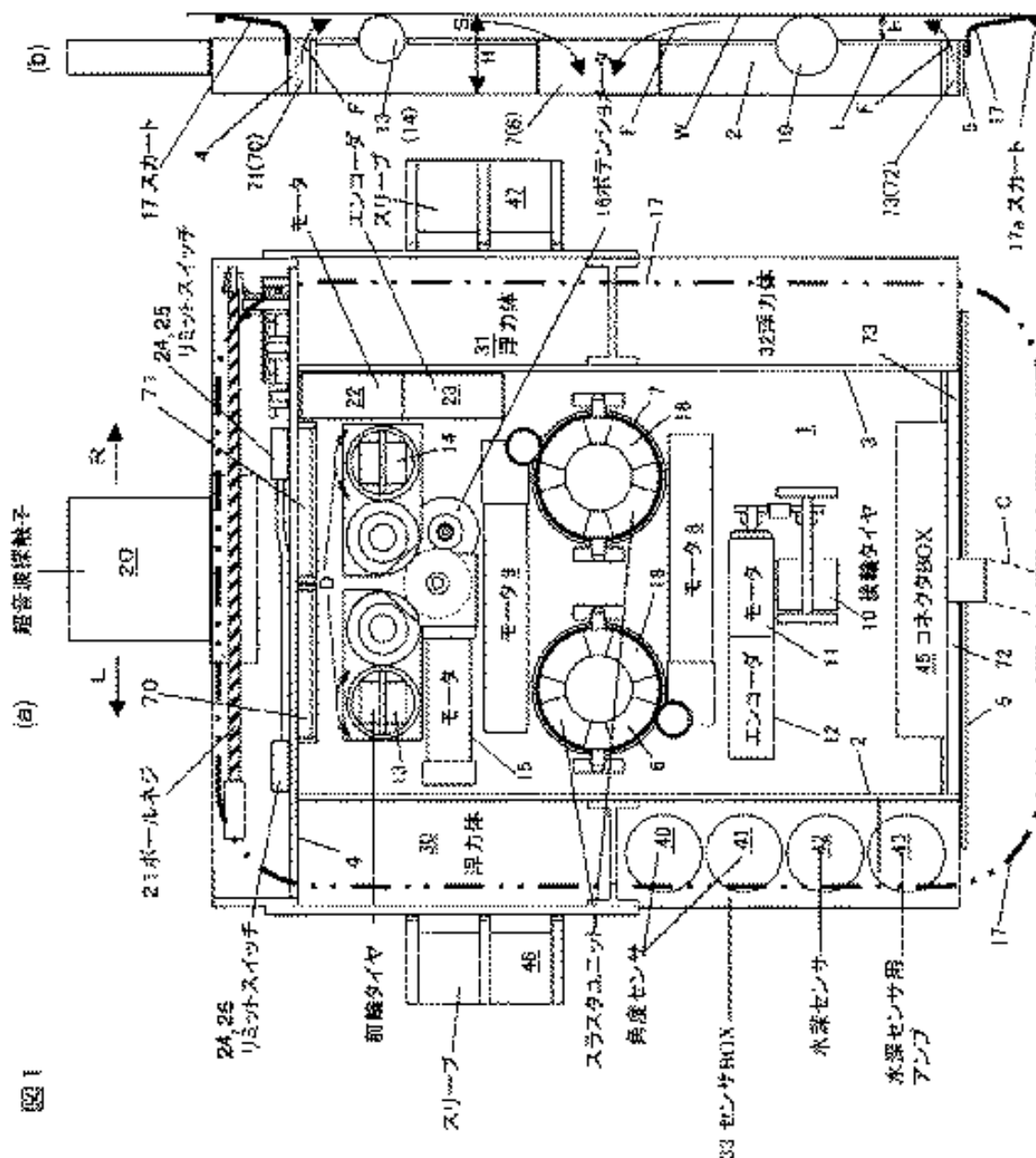
ZHEJIANG UNIVERSITY

Family 13/20 - FAMPAT - ©Questel

**Title**

(JP2005106655)

**Underwater** moving device**Images**



#### Publication numbers with kind code & date

|              |    |            |              |
|--------------|----|------------|--------------|
| JP4235523    | B2 | 2008-12-19 | JP4235523    |
| JP2005106655 | A  | 2005-04-21 | JP2005106655 |



#### Abstract

(JP2005106655)

**PROBLEM TO BE SOLVED:** To provide an **underwater** moving device capable of acquiring stably an adsorbing force by a thrust fan and a skirt.

**SOLUTION:** This **underwater** moving device is equipped with thruster units 6, 7 on one side of a bottom plate part 1 of a body structure part, and a skirt member 17 on the other side respectively. The device is provided with suction ducts 70-73 in the water, and stuck to an inspection object wall surface W in the water, and moves it by a rear wheel tire 8 and front wheel tires 13, 14. In the device, the suction ducts 70-73 are provided on the bottom plate part 1, and taking of suction water by the thruster units 6, 7 is performed from the suction ducts 70-73, and hereby a water flow F is generated in a space S divided by the skirt member 17, and the adsorbing force to the inspection object wall surface W is generated by the water flow F.

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**Inventors**

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Yosuke Takatori

MORI ISATO

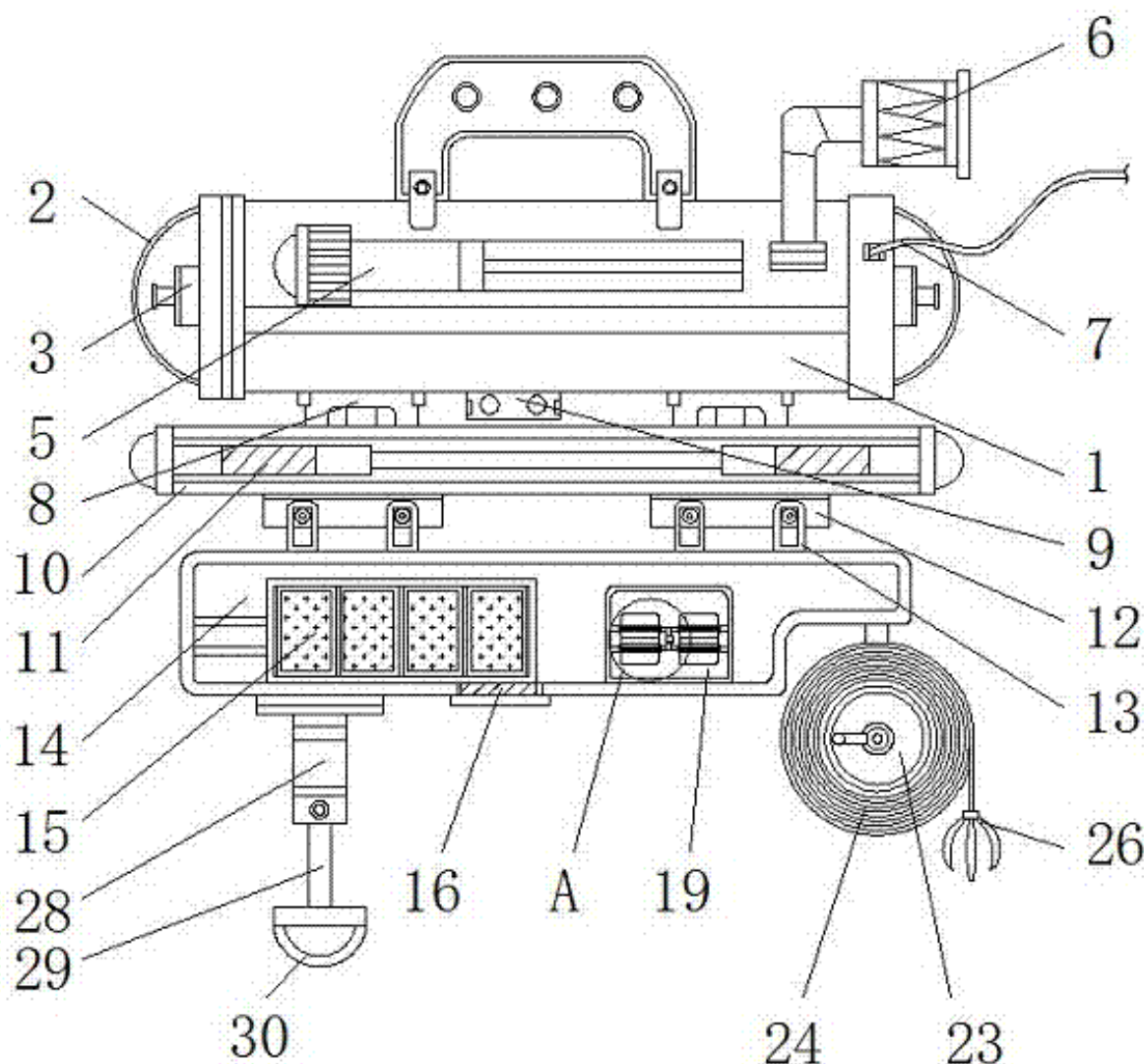
**Latest standardized assignees - inventors removed**

HITACHI

Family 14/20 - FAMPAT - ©Questel

**Title**

(CN109094758)

An **underwater vehicle** capable of monitor and emergency rescue**Images****Publication numbers with kind code & date**[CN109094758](#)

A 2018-12-28

CN109094758

**Abstract**

(CN109094758)

An **underwater vehicle** capable of monitor and emergency rescue include a cylinder, first rotating shaft and fixing plate, the left and right ends of the cylinder body are connected with a pressure-resistant cover, and a **camera** is arranged inside the pressure-resistant cover, the first rotating shaft is mounted on both front and rear ends of the cylinder body, and an

illumination lamp is connected to the outside of the first rotating shaft, the right side of the illumination lamp is provided with a propeller, and a data packet is arranged on the right side of the propeller, the lower end of the cylinder is connected with a connecting plate, An **underwater vehicle** capable of monitor and emergency rescue, the first rotating shaft and the lighting lamp form a rotating structure, and the lighting lamps are symmetrical with respect to each other with respect to the vertical centerline of the cylinder, The lighting lamp can be used for lighting **underwater** so as to facilitate shooting and imaging by the **camera**, and the lighting lamp is rotated with the cylinder through the first rotating shaft so as to adjust the lighting angle of the lighting lamp, and the rotating angle of the lighting lamp can be fixed by stopping the rotating shaft at will, so that the lighting range of the lighting lamp is further.

**Inventors**

JIANG HAIYAN

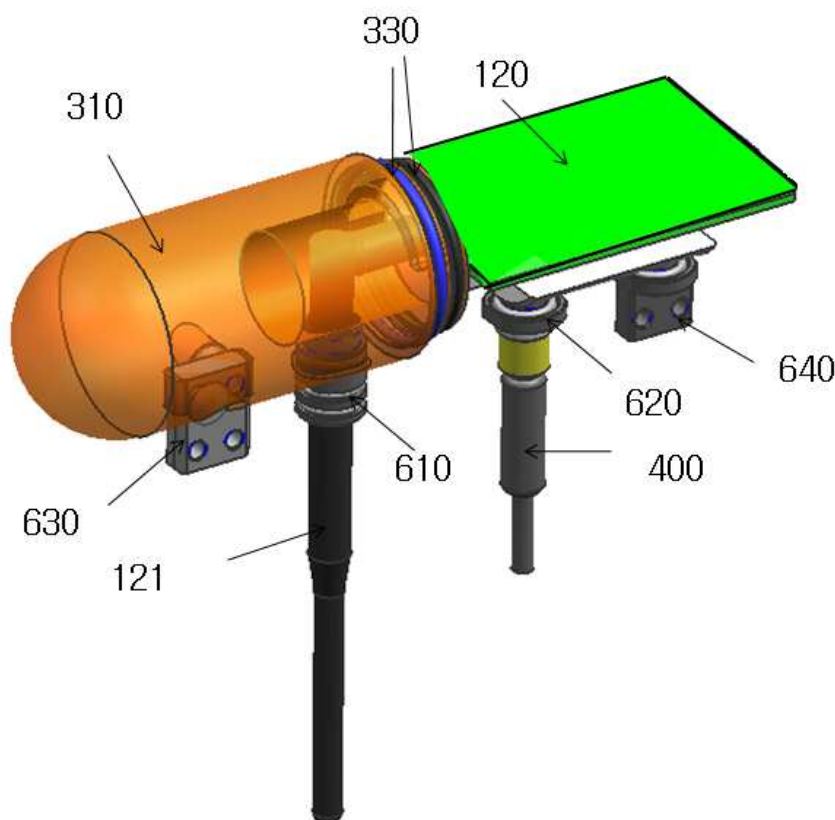
**Latest standardized assignees - inventors removed**

DONGGUAN QIQU ROBOT TECHNOLOGY

Family 15/20 - FAMPAT - ©Questel

**Title**

(KR101224893)

Emergency module for an **underwater** robot capable of quickly coping with emergency situations**Images****Publication numbers with kind code & date**

KR101224893

B1 2013-01-22

KR101224893

**Abstract**

(KR101224893)

PURPOSE: An emergency module for an **underwater** robot is provided to communicate with administrators using an emergency module device when emergency situations are generated in an unmanned **underwater vehicle**.

CONSTITUTION: An emergency module for an **underwater** robot comprises a GPS module(100') and a RF module(120). The GPS module comprises a GPS(110) and a GPS substrate(100) to generate position signals by sensing the current position of an unmanned **underwater vehicle**. When emergency situations are generated in the unmanned **underwater vehicle**, the FR module transmits the position signals and emergency signals receiving from a control part to administrators and transmits emergency adaptive signals receiving from the administrators to the control part.

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#### **Inventors**

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GUBEObMO

CHUNG, CHAN IK

PYOSANGHO

HEO, JUN KI

YUN, SEOK-JUN

#### **Latest standardized assignees - inventors removed**

KOREA INSTITUTE OF OCEAN SCIENCE & TECHNOLOGY

Family 16/20 - FAMPAT - ©Questel

#### **Title**

(US5947051)

**Underwater** self-propelled surface adhering robotically operated **vehicle**

#### **Images**

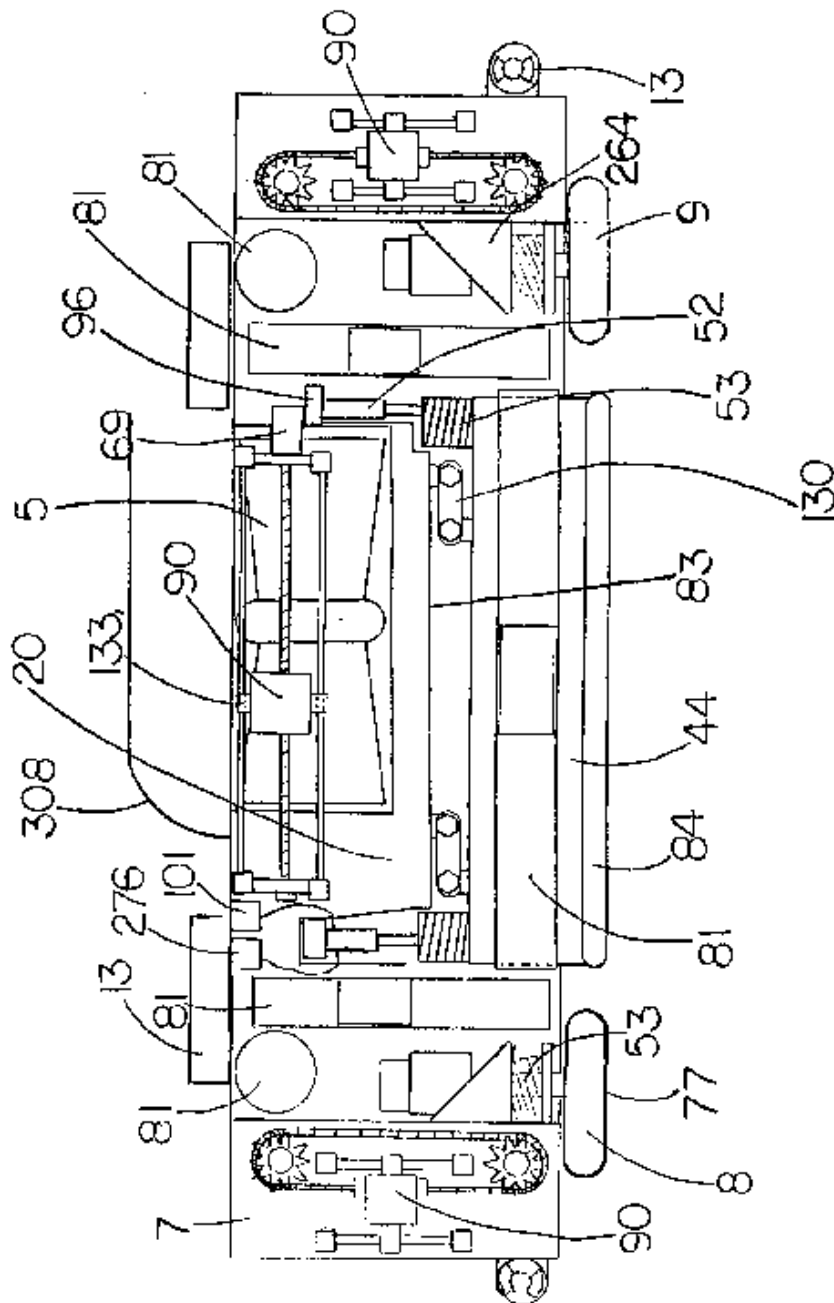


FIG. 1A

**Publication numbers with kind code & date**

US5947051

A 1999-09-07

US5947051

**Abstract**

(US5947051)

An **underwater** self-propelled surface-adhering robotically operated **vehicle** capable of being navigated through a volume of water and of adhering itself to an **underwater** surface and traversing along the surface. The **vehicle** has a main body with an interior suction chamber and a motor driven impeller disposed in the chamber to draw water through the bottom end of the chamber and expel it at the top end and thereby create a negative pressure force at the bottom end to maintain the **vehicle** in contact with the **underwater** surface. Thrusters on the main body allow the **vehicle** to be driven through a volume of water before and after attachment to the **underwater** surface as well as to hold station in mid water for tasks and inspections. The **vehicle** may be provided with an evacuable enclosure to provide an environment for task accomplishment

and with measurement and inspection devices and tools for **underwater** hull cleaning, welding, and other **underwater** tasks.

## Inventors

GEIGER MICHAEL B

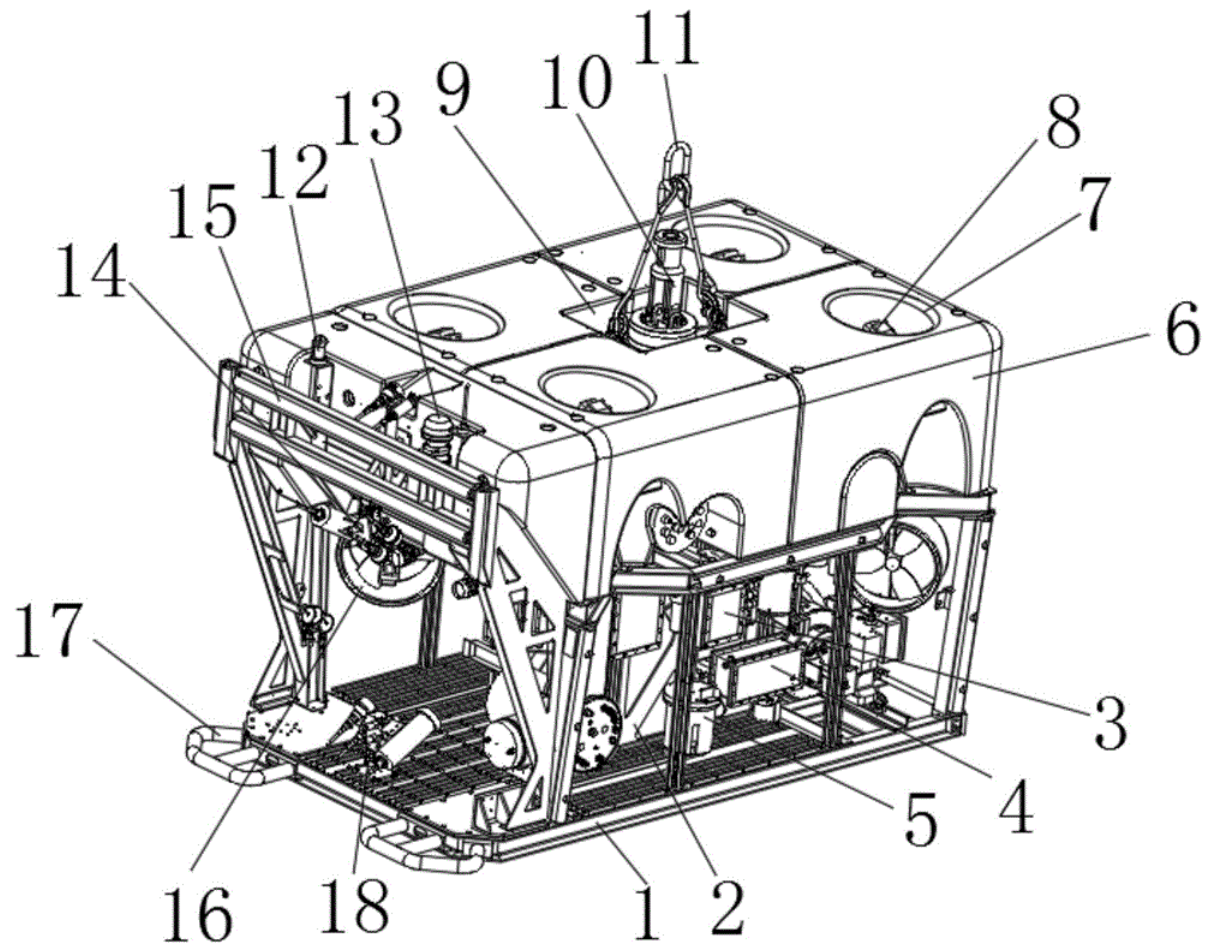
Family 17/20 - FAMPAT - ©Questel

## Title

(CN109591981)

**Underwater** detecting robot for marine engineering

## Images



## Publication numbers with kind code & date

|                             |   |            |              |
|-----------------------------|---|------------|--------------|
| <a href="#">CN109591981</a> | B | 2019-11-15 | CN109591981B |
| <a href="#">CN109591981</a> | A | 2019-04-09 | CN109591981  |



## Abstract

(CN109591981)

The invention discloses an **underwater** detecting robot for marine engineering. The **underwater** detecting robot comprises a fixed bottom plate. The upper surface of the fixed bottom plate is provided with a mounting frame, the surface of one side of the mounting frame is provided with a junction box and a power supply, a bottom sonar is mounted on the side, close to the power supply, of the upper surface of the fixed bottom plate, a suspension frame is connected to the edge of the upper surface of the fixed bottom plate, a set of mounting slots are formed in each of the positions, close to the four corners, of the upper surface of the suspension frame, and the four sets of mounting slots are internally provided with floating propellers; and a hoisting slot is formed in the center of the upper surface of the suspension frame. By means of the **underwater** detecting robot for marine engineering, a hanger rope for robot diving can be better reinforced, and falling of the hanger rope is prevented; and in the transverse movement period of the robot, a main body of the robot can be effectively protected, the anti-collision buffer function is achieved, and robot advancing can be assisted when the robot is insufficient in power or the water pressure is too large.

## Inventors

THE INVENTOR HAS WAIVED THE RIGHT TO BE MENTIONED

**Latest standardized assignees - inventors removed**

MESOTHERMIC RESEARCH INSTITUTE OF OCEANOGRAPHY & AGRICULTURE

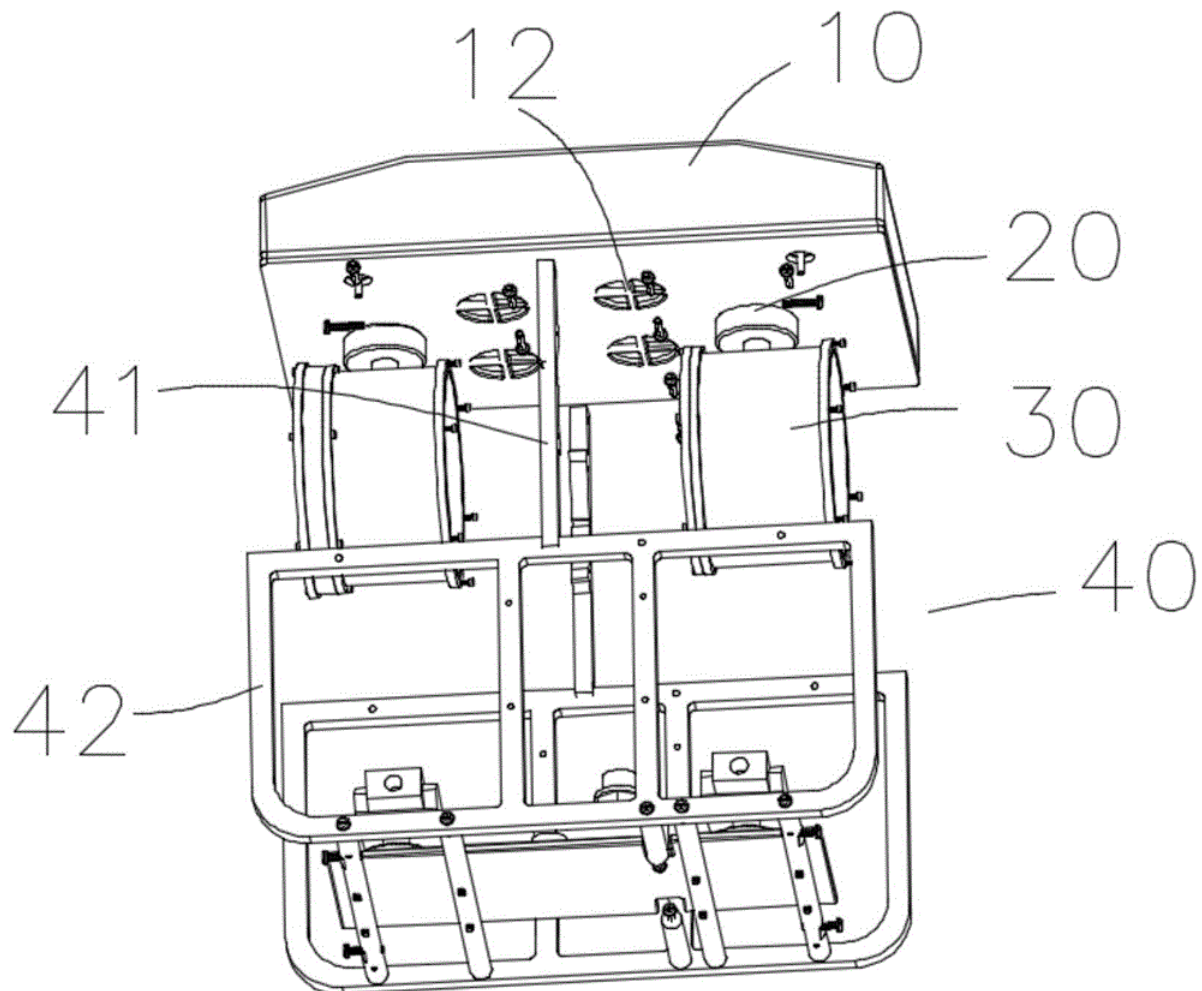
Family 18/20 - FAMPAT - ©Questel

**Title**

(CN110239694)

Ocean communication **remote** control submersible

**Images**



**Publication numbers with kind code & date**

[CN110239694](#)

A

2019-09-17

CN110239694



**Abstract**

(CN110239694)

The invention discloses an ocean communication **remote** control submersible. The ocean communication **remote** control submersible comprises an upper floating cover body, two power steering waterproof motors, two spiral propellers, a fixing frame, a **camera** component and a control circuit board; the control circuit board comprises a control module; the control module comprises a power module and a shooting module; the upper floating cover body is provided with a water through **groove**, a cylindrical hole and a cable connecting hole; the cable connecting hole is formed in the cylindrical hole; the water through **groove** is formed in the middle part of the upper floating cover body; one end of a buoyancy towrope is connected to a towing machine; the other end of the buoyancy towrope penetrates through the cylindrical hole to be fixed to the cable connecting hole; the towing machine unwinds the buoyancy towrope so that the ocean communication **remote** control submersible dives into the ocean; the power module drives the power steering waterproof motor and the spiral propeller to operate to provide power; and the shooting module controls the **camera** component to shoot. The spiral propeller provides advancing or retreating power; the power steering waterproof motor controls steering; the control accuracy is high; the ocean communication **remote** control submersible is simple and convenient; and the ocean communication **remote** control

submersible is convenient for working personnel to manage and control.

### Inventors

CUI XIAOFEI

GE WEIDONG

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KAN CHUNRONG

WANG CHENGGUI

### Latest standardized assignees - inventors removed

TAIZHOU KEPUNI COMMUNICATION EQUIPMENT

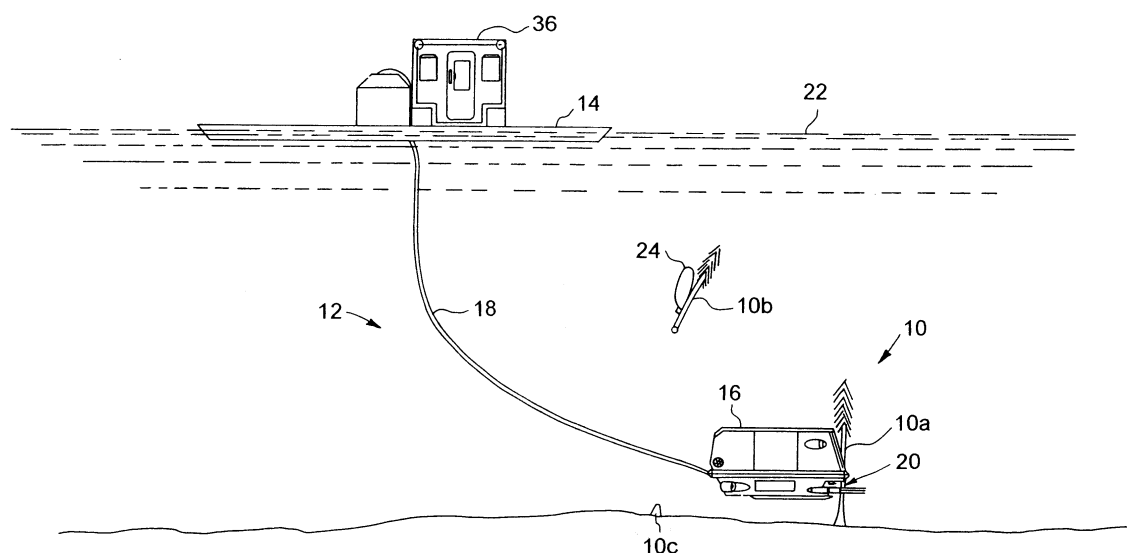
Family 19/20 - FAMPAT - ©Questel

### Title

(EP1434479)

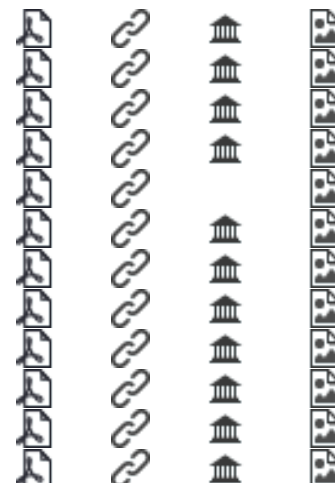
Method and apparatus for **underwater** tree cutting and retrieval

### Images



### Publication numbers with kind code & date

|                               |    |            |               |
|-------------------------------|----|------------|---------------|
| <a href="#">CA2635367</a>     | C  | 2011-10-11 | CA2635367     |
| <a href="#">CA2353069</a>     | C  | 2009-05-12 | CA2353069     |
| <a href="#">DE60214744</a>    | T2 | 2007-10-04 | DE60214744    |
| <a href="#">DE60214744</a>    | D1 | 2006-10-26 | DE60214744    |
| <a href="#">AT339092</a>      | T  | 2006-10-15 | ATE339092     |
| <a href="#">EP1434479</a>     | B1 | 2006-09-13 | EP1434479     |
| <a href="#">US6789587</a>     | B2 | 2004-09-14 | US6789587     |
| <a href="#">EP1434479</a>     | A1 | 2004-07-07 | EP1434479     |
| <a href="#">WO03/005806</a>   | A1 | 2003-01-23 | WO200305806   |
| <a href="#">US20030010404</a> | A1 | 2003-01-16 | US20030010404 |
| <a href="#">CA2353069</a>     | A1 | 2003-01-13 | CA2353069     |
| <a href="#">CA2635367</a>     | A1 | 2003-01-13 | CA2635367     |



### Abstract

(EP1434479)

The invention relates to an apparatus (12) and method for cutting submerged trees (10) at an **underwater** logging site and

for retrieving the cut trees. Once cut, each tree (10) is retrieved to the water surface by an inflatable bag (24) deployed from and inflated by the apparatus (12). The apparatus (12) includes a control unit (36) positioned on a surface vessel (14), such as a barge or large boat, and an **underwater** vessel (16) connected together by an umbilical (18). Preferably the **underwater** vessel (16) is a remotely controllable submersible including a grapple (44) for releasably holding each tree (10) to be cut, a saw, a gas supply connectable to a gas source located on the surface vessel (14), and an air bag deployment and inflation assembly for inflating the air bag (24) and securely attaching it to the tree (10). The **underwater** vessel (16) is initially loaded with a plurality of air bags (24) which are stored in a magazine located in the interior of the vessel (16). The air bags (24) are sequentially moved from the magazine on to an ejection track at a front end of the vessel (16) disposed above the saw and grapple (44). Each air bag (24) is secured to a cartridge for coupling the bag (24) to the magazine and the ejection track and for holding a tree fastener. In its uninflated state, the air bag (24) is contained within a tubular housing which is releasably connectable to the cartridge. The housing is ejected from the cartridge when the air bag (24) is inflated and deployed.

**Inventors**

MOSSMAN STEWART A

METSKER FOREST G

**Latest standardized assignees - inventors removed**

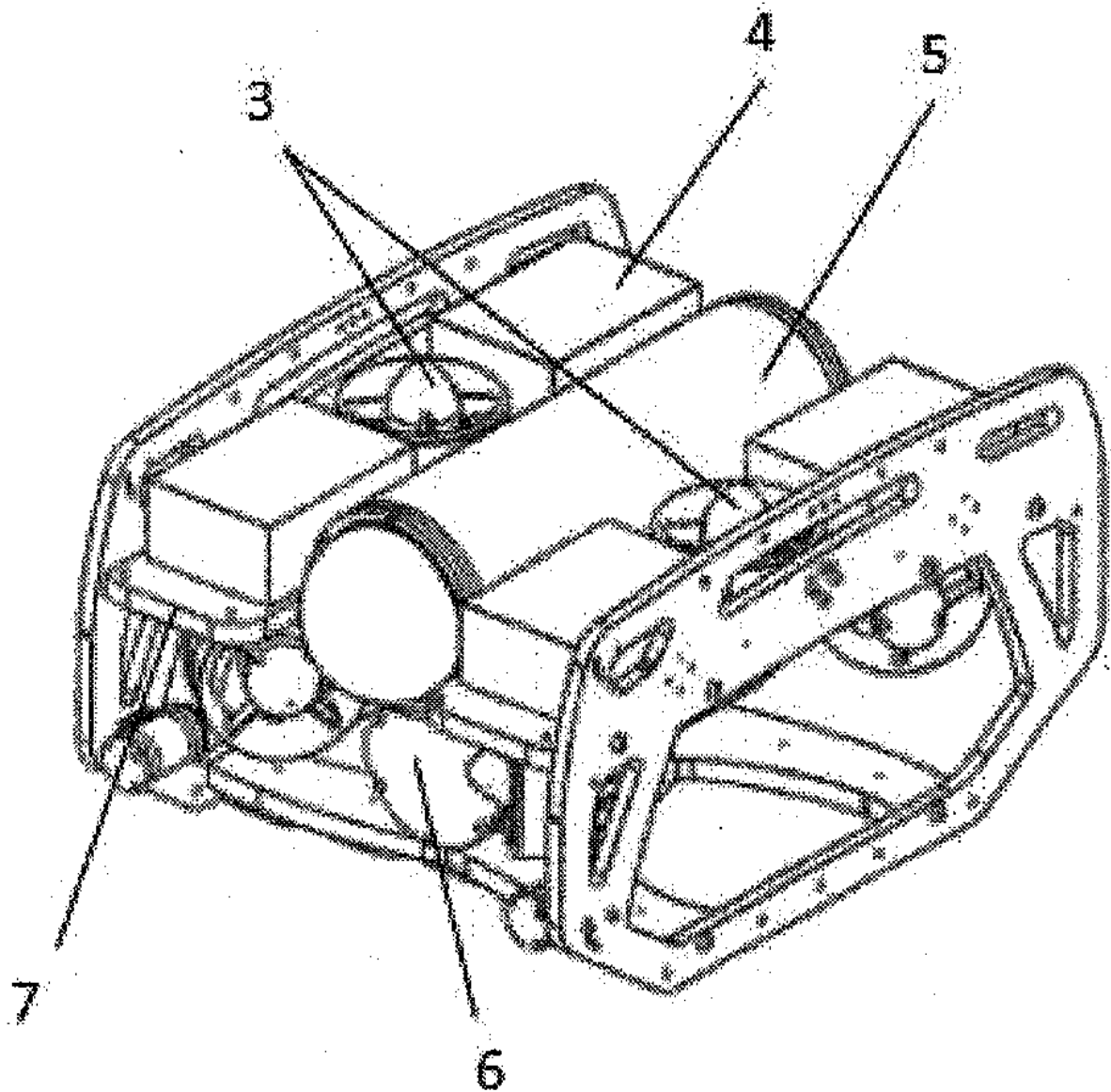
TRITON RESOURCES

Family 20/20 - FAMPAT - ©Questel

**Title**

(CN207826508U)

Small -size have cable **underwater vehicle** under water**Images**

**Publication numbers with kind code & date**[CN207826508](#)

U

2018-09-07

CN207826508U

**Abstract**

(CN207826508)

The utility model provides a small -size have cable **underwater vehicle** under water, bolt fixed connection is passed through with bottom plate (14) in its curb plate (1), body material (4) with the glue bond on the body layer board, body cover (2) covers body material (4) to it is fixed with the glue bond, vertical thrusters (3) and horizontal propeller (12) and body layer board (7) fixed connection, control cabinet fixed strip (9) and body layer board (7) fixed connection, battery flat fixed strip (10) and bottom plate (14) fixed connection, lamp (15) are with the card edge of steel wire hoopat lamp connecting piece (16) both ends, screw hole on lamp (16) and the through -hole on curb plate (1) pass through bolt fixed connection, and another screw hole adopts bolt to pass curb plate lampspout (1.1) mode to connect, and the adjusting bolt elasticity can realize the light directive that slides. This navigation ware is easy and simple to handle, extremely nimble, with low costs, is fitfor promoting.

**Inventors**

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**Latest standardized assignees - inventors removed**

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