

**PERÚ**Presidencia
del Consejo de Ministros**INDECOPI**

*“Decenio de la Igualdad de Oportunidades para mujeres y hombres”
“Año de la unidad, la paz y el desarrollo”*

DIRECCIÓN DE INVENCIONES Y NUEVAS TECNOLOGÍAS**EXPEDIENTE N° 000641-2021/DIN****RESOLUCIÓN N° 000395-2023/DIN-INDECOPI****Lima, 28 de febrero de 2023****Patente de modelo de utilidad: Concedida**

Mediante expediente N° 000641-2021/DIN, iniciado el 30 de abril de 2021, Rafael Alejandro PEÑA SIÑA y Carlos PEÑA ARRUNÁTEGUI, ambos de Perú, solicitan patente de modelo de utilidad para “SISTEMA DE DESINCRUSTACIÓN DE DEPÓSITOS MINERALES EN TUBERÍAS DE EXTRACCIÓN DE PETRÓLEO (HIDROCARBUROS), GAS NATURAL Y OTROS FLUIDOS”, C.I.P.8 C02F 5/00, cuyos inventores son los mismos solicitantes.

1. EXAMEN DE PATENTABILIDAD

El modelo de utilidad solicitado reúne los requisitos establecidos en la Decisión 486 de la Comisión de la Comunidad Andina que aprueba el Régimen Común sobre Propiedad Industrial, conforme aparece en el examen de patentabilidad de fecha 01 de febrero de 2023.

La presente Resolución se emite en aplicación de la norma legal antes mencionada y en uso de las facultades conferidas por los artículos 37 y 40 de la Ley de Organización y Funciones del Instituto Nacional de Defensa de la Competencia y de la Protección de la Propiedad Intelectual (Indecopi) sancionada por Decreto Legislativo N° 1033, concordado con el artículo 4 del Decreto Legislativo 1075 que aprueba las disposiciones complementarias a la Decisión 486 de la Comisión de la Comunidad Andina.

2. RESOLUCIÓN DE LA DIRECCIÓN DE INVENCIONES Y NUEVAS TECNOLOGÍAS

OTORGAR patente de modelo de utilidad para “SISTEMA DE DESINCRUSTACIÓN DE DEPÓSITOS MINERALES EN TUBERÍAS DE EXTRACCIÓN DE PETRÓLEO (HIDROCARBUROS), GAS NATURAL Y OTROS FLUIDOS”, C.I.P.8 C02F 5/00, a favor de Rafael Alejandro PEÑA SIÑA y Carlos PEÑA ARRUNÁTEGUI, ambos de Perú, por un plazo de diez (10) años, contados desde el 30 de abril de 2021, fecha de presentación de la solicitud, aprobándose las 5 reivindicaciones del pliego originalmente presentado con fecha 30 de mayo de 2021.

Regístrese y Comuníquese

Firma Digital

INSTITUTO NACIONAL DE DEFENSA DE LA COMPETENCIA Y DE LA PROTECCIÓN DE LA PROPIEDAD INTELECTUAL

Firmado digitalmente por CASTRO
CALDERÓN Manuel Javier FAU
20133840533 hard
Motivo: Soy el autor del documento
Fecha: 28.02.2023 16:45:10 -05:00

MANUEL CASTRO CALDERÓN
Director de Invenciones y
Nuevas Tecnologías
INDECOPI

**Instituto Nacional de Defensa de la Competencia y de la Protección de la Propiedad Intelectual**

Calle De la Prosa 104 - San Borja, Lima, Perú/ Central: (511) 224-7800

www.indecopi.gob.pe



INSTITUTO NACIONAL DE DEFENSA DE LA
COMPETENCIA Y DE LA PROTECCIÓN DE LA
PROPIEDAD INTELECTUAL
Calle de la Prosa N° 104 - San Borja

DIRECCIÓN DE INVENCIONES Y
NUEVAS TECNOLOGÍAS

CÉDULA DE NOTIFICACIÓN

SOLICITANTE(S) : Rafael Alejandro PEÑA SIÑA y Carlos PEÑA ARRUNÁTEGUI

REPRESENTANTE : Carlos PEÑA ARRUNÁTEGUI

DIRECCIÓN : Calle Alfredo Maldonado N° 795, Dpto. 401, PUEBLO LIBRE - LIMA
- LIMA

MODALIDAD : Modelo de utilidad

Expediente N° 000641-2021/DIN

Lima, 02 de marzo de 2023

En la fecha, la Dirección de Invenciones y Nuevas Tecnologías del Indecopi, procede a notificar la **Resolución N° 000395-2023/DIN-INDECOPI de fecha 28 de febrero de 2023, el Examen de Patentabilidad CGO 130-2022 y el proveído de fecha 03 de febrero de 2023**, y se pone en conocimiento que contra la referida resolución procede interponer los recursos administrativos de RECONSIDERACIÓN o APELACIÓN, dentro del plazo de quince (15) días hábiles, contados a partir del día siguiente a la fecha de recepción de la presente.



Firmado digitalmente por ALFARO
RAMÍREZ Jaicel FAU 20133840533
hard
Motivo: Soy el autor del documento
Fecha: 02.03.2023 10:50:22 -05:00

JAICEL ALFARO RAMÍREZ
Coordinadora Legal
Dirección de Invenciones y
Nuevas Tecnologías
INDECOPI

Constancia de recepción

Nombre:

C.E. / DNI N° :

Vínculo:

Firma y/o sello:

Fecha:

Hora:

Expediente N° 000641-2021/DIN

Modalidad: Modelo de Utilidad

Lima, 03 de febrero de 2023

Visto el Examen de Patentabilidad **CGO N° 130-2022**, de fecha 01 de febrero de 2023, en el que se concluye que:

- Las reivindicaciones 1 a 5 cumplen con los requisitos establecidos en el artículo 81 de la Decisión 486 de la Comisión de la Comunidad Andina.

PASE EL EXPEDIENTE A RESOLVER



Firma Digital

Firmado digitalmente por LIVIA
PONCE Erika Maria FAU
20133840533 hard
Motivo: Soy el autor del documento
Fecha: 03.02.2023 11:51:41 -05:00

ERIKA LIVIA PONCE
Profesional en Ingeniería
Dirección de Invenciones y
Nuevas Tecnologías
INDECOPI

Examen de patentabilidad	
CGO	130-2022

Expediente	000641-2021/DIN	Fecha de ingreso	2021-04-30
		Fecha de presentación	2021-04-30

Solicitud internacional PCT	N°	-
	Fecha	-

Solicitante(s)	PEÑA ARRUNÁTEGUI Carlos
	PEÑA SIÑA Rafael Alejandro

Prioridad(es)	Fecha de prioridad(es)
No reivindica	-

Modalidad de protección	Patente de Invención (Decisión 486/art. 45)	
	Modelo de Utilidad (Decisión 486/art. 45 concordante con art. 85)	X
Título	«Sistema de desincrustación de depósitos minerales en tuberías de extracción de petróleo (hidrocarburos), gas natural y otros fluidos»	

Referencia(s)	-
----------------------	---

Opositor(es)	-
---------------------	---

1. Textos a analizar	Originalmente presentado	Modificaciones	Fecha	Ampliación ¹ (Decisión 486/art. 34)	
				SI	NO
Memoria descriptiva	X				
Figura(s)	X				
Reivindicación(es)	1 a 5				
Resumen	X				

¹ En caso de que las modificaciones realizadas impliquen una ampliación total de lo originalmente presentado, esta nueva documentación modificada no será tomada en cuenta y toda opinión final emitida se realizará en función a la documentación original.

* Constituye una ampliación parcial.

Listado de secuencias					
Otros ²					
Oposición					
Respuesta a oposición					

	Si	No
2. No invenciones y excepciones a la patentabilidad (Decisión 486/art. 15, 20 y/o 82 ³)		1 a 5
3. Usos (Decisión 486/art. 14 ⁴ y 21)		1 a 5
4. Unidad de invención ⁵ (Decisión 486/art. 25)	1 a 5	

5. Requisitos a evaluar	Cumple	No cumple
5.1 Para solicitud fraccionaria		
No amplía divulgación de la solicitud inicial (Decisión 486/art. 36)		
Reivindicaciones: No genera doble protección de la solicitud inicial (D.L. 1075/art. 29)		
5.2 Suficiencia, claridad, concisión y soporte		
Memoria descriptiva (Decisión 486/art. 28)	X	
Reivindicaciones (Decisión 486/art. 30)	1 a 5	
5.3 Novedad (Decisión 486/art. 16)		
5.4 Nivel inventivo (Decisión 486/art. 18)		
5.5 Aplicación industrial (Decisión 486/art. 19)		
5.6 Para modelos de utilidad (Decisión 486/art. 81 ³)	1 a 5	

² Esto es: argumentos, resultados de ensayos, cuadros comparativos, etc.

³ En los casos de patentes de modelo de utilidad.

⁴ Interpretación por el Tribunal de Justicia de la Comunidad Andina que, a la luz del Proceso n.º 89-A-2000 considera patentables los productos o los procedimientos, mas no los usos.

⁵ En caso se encuentre más de un concepto inventivo en la presente solicitud y se identifique más de un grupo de reivindicaciones relacionados con dichos conceptos inventivos, se procederá con el análisis respecto al primer grupo encontrado.

6	Análisis y opinión escrita acerca de los requerimientos considerados en los numerales anteriores
6.1	Cita(s) y documentación consideradas para la emisión del examen
	Antecedente(s) relevante(s) del estado de la técnica: D1= CN 202400907U publicado el 2012-08-29 (BEIJING GUOYE SHICHENG TECHNOLOGY DEVELOPMENT CO., LTD) «Circuito de tensión de corriente continua y circuito de aplicación del dispositivo de bloqueo, alivio, desincrustación y eliminación de algas»
6.2	Formulación de opinión y argumentos respecto del/de los numeral(es)
	<u>Respecto al numeral 5.6 (Para modelos de utilidad)</u> <u>Novedad</u> La reivindicación 1 referida a un sistema para la desincrustación de depósitos minerales en tuberías de extracción de hidrocarburos, gas natural y otros fluidos, se diferencia del documento D1 en que, si bien dicho documento divulga un dispositivo para desatascar, desincrustar y eliminar algas mediante un circuito de corriente continua y al menos una varilla de electrodo a través de la cual pasa la corriente continua para aliviar el bloqueo, desincrustar y eliminar algas de los equipos de proceso de larga distancia de un sistema de inyección y producción donde, el circuito de corriente continua se forma conectando un transformador de potencia, un bloque de puente rectificador, un circuito de filtro, un estabilizador de voltaje integrado ajustable de tres extremos, un elemento de control de resistencia-capacitancia y similares secuencialmente, de modo que después de que el extremo de salida del circuito de corriente continua manda corriente a un electrodo positivo y un electrodo negativo, el amplificador de fase líquida se conecta con una tubería de entrada de agua del equipo de descamación a través de una tubería articulación, convirtiendo el transformador T1 la tensión de alimentación en tensión de corriente alterna, mientras que el bloque de puente rectificador rectifica la tensión de corriente alterna emitida y la convierte en tensión de corriente continua, y el voltaje de corriente continua es filtrado por los capacitores C1 y C2 que están conectados en paralelo y se aplica al extremo del bloque estabilizador de voltaje integrado ajustable de tres extremos, y se envía al electrodo positivo y al electrodo negativo del líquido amplificador de fase a través de un condensador C4 que está conectado en paralelo con los condensadores C1 y C2 (<i>Ver resumen, párrafos 0029 a 0033 y 0035 a 0038 del documento traducido, Figuras 2, 4 y 6, de D1</i>); sin embargo, el mencionado documento D1 no contempla un arreglo donde cada dispositivo cargado sea energizado de manera independiente y donde el circuito comprenda además una celda solar, una batería, y la disposición de elementos particular de la placa de circuito impreso definido en la invención. Por lo tanto, la reivindicación 1 tiene novedad. <u>Ventaja Técnica</u> El sistema para la desincrustación de depósitos minerales en tuberías de extracción de hidrocarburos, gas natural y otros fluidos, al contemplar el funcionamiento de los dispositivos de manera independiente de modo que cada uno tiene su propia fuente de energía, circuito electrónico, embobinado y magneto, es posible evitar las paradas de la producción para realizar el mantenimiento de alguno de ellos, ante una eventual falla, tal como se desprende de la página 3 de la memoria descriptiva; por lo que, la reivindicación 1 tiene ventaja técnica. De esta forma, la reivindicación 1 cumple con los requisitos establecidos en el artículo 81 de la Decisión 486 de la Comisión de la Comunidad Andina. Asimismo, las reivindicaciones 2 a 5, al ser dependientes directamente de la reivindicación 1, se consideran que también cumplen con los requisitos establecidos en el artículo 81 de la Decisión 486 de la Comisión de la Comunidad Andina.

7. Conclusión(es)	Fecha de emisión: 2023-02-01
Con base en la Decisión 486 de la Comisión de la Comunidad Andina: Las reivindicaciones 1 a 5 cumplen con los requisitos establecidos en el artículo 81 de la Decisión 486 de la Comisión de la Comunidad Andina.	Elaborado por,  Claude García Ortiz Examinadora de Patentes CIP 114832

Revisado por:



Firmado digitalmente por CRUZ
TAPIA Nelson Alexander Martin FAU
20133840533 hard
Motivo: Soy el autor del documento
Fecha: 01.02.2023 17:08:56 -05:00

NELSON ALEXANDER CRUZ TAPIA
Especialista 2
Dirección de Invenciones y
Nuevas Tecnologías
INDECOPÍ

Reporte de búsqueda CGO 130-2022		Expediente N° 000641-2021/DIN
Fecha de ingreso: 2021-04-30	Fecha de presentación: 2021-04-30	
C.I.P. (8) : C02F 5/00	Fecha de prioridad: No reivindica	
Términos de búsqueda empleados: pipe; removal; descaling; electrode; ionic; magnet; battery C02F		
Documentos considerados relevantes		
Categoría	Cita del documento, indicando las partes pertinentes y la fecha de publicación	Reivindicaciones afectadas
A	CN 202400907U publicado el 2012-08-29 (BEIJING GUOYE SHICHENG TECHNOLOGY DEVELOPMENT CO., LTD) Resumen, párrafos 0029 a 0033 y 0035 a 0038 del documento traducido, Figuras 2, 4 y 6. https://worldwide.espacenet.com/patent/search/family/046698570/publication/CN202400907U?q=pn%3DCN202400907U	1 a 5
Categoría de documentos citados: X: Particularmente relevante por sí solo. A: Estado de la técnica general, no particularmente relevante. O: Divulgación oral. E: Solicitud presentada antes pero publicada después de la fecha de presentación de la solicitud examinada (sólo con X) D: Citado en la solicitud. L: Citado por otras razones. P: Anterior a la fecha de presentación pero posterior a la fecha de prioridad. T: Teoría o principio en el que se basa la invención &: Documento miembro de la misma familia de patentes.		
Examinador : Ing. Claude García Ortiz		



Espacenet

CN202400907U Direct-current voltage circuit and blockage, relieving, descaling and algae removing device applying circuit

Applicants: BEIJING GUOYE SHICHENG TECHNOLOGY DEV CO LTD

Inventors: LIPING GAO,ZHAOGANG LI

Classifications:

IPC

C02F5/00;

Priorities: CN201120243839U 2011-07-12

Application: CN201120243839U·2011-07-12

Publication: CN202400907U·2012-08-29

Published as: CN202400907U

Direct-current voltage circuit and blockage, relieving, descaling and algae removing device applying circuit

Abstract

The utility model relates to a direct-current voltage circuit in which a rare-earth material serving as energy is added into an electrode rod and through which direct current passes, and a blockage relieving, descaling and algae removing device applying the direct-current voltage circuit. The direct-current voltage circuit is formed by connecting a power transformer, a rectifier bridge block, a filter circuit, a three-end adjustable integrated voltage stabilizer, a control resistance-capacitance element and the like sequentially; after the output end of the direct-current voltage circuit outputs direct current to a positive electrode and a negative electrode of a liquid phase amplifier (the electrode rod), the liquid phase amplifier is connected with a water inlet pipeline of scaling equipment through a pipe joint; power voltage is converted into alternating-current voltage by the transformer T1, and the outputted alternating-current voltage is rectified by the rectifier bridge block and converted into direct-current voltage; and the direct-current voltage is filtered by capacitors C1 and C2 which are connected in parallel and is applied to the 52 end of the three-end adjustable integrated voltage stabilizing block, and is outputted to the positive electrode and the negative electrode of the liquid phase amplifier through a capacitor C4 which is connected in parallel with the capacitors C1 and C2. By the direct-current voltage circuit and the blockage relieving, descaling and algae removing device, the scale preventing and removing effects are good, the problems of descaling and corrosion resistance of long-distance process equipment of an injection-production system are solved, and the effects of oil displacement, blockage relieving, sterilization and algae removal are achieved.

Notice

This translation is machine-generated. It cannot be guaranteed that it is intelligible, accurate, complete, reliable or fit for specific purposes. Critical decisions, such as commercially relevant or financial decisions, should not be based on machine-translation output.

DESCRIPTION CN202400907U

¹⁰ DC voltage circuit and device for unblocking, descaling and algae killing using the circuit

[0001]

¹⁴ technical field

[0002]

¹⁸ The invention relates to a DC voltage circuit and a device for unblocking, descaling and algae killing using the circuit. □

[0003]

²³ Background technique

[0004]

²⁷ At present, the ultra-sound frequency anti-scaling and descaling devices reported in relevant domestic literature are mainly used in boilers and heat exchange equipment with water as the medium. Good anti-scaling and descaling effects have achieved ideal results in practical applications, and have been more and more widely used in industrial and agricultural production and living fields. □

[0005]

³⁴ In practical application, it is found that the heat exchange equipment in the fields of industrial and agricultural production and civil life in our country has various shapes, especially some tubular heat exchange devices have very long geometric dimensions, and the longest can reach hundreds of meters.

³⁷ The propagation of ultrasonic waves on such pipelines gradually attenuates, and the ultrasonic kinetic energy

gradually weakens.

³⁹ The prevention and removal effect is not ideal in the place of the long-distance ultrasonic energy converter, so the energy converter has to be added to the long-distance pipeline, which brings a lot of trouble to the actual installation of equipment and increases the cost of installation.

[0006]

⁴⁵ my country's fresh water resources are relatively scarce, and a considerable number of circulating water used by industrial and mining enterprises and thermal power plants are directly drawn from river water for use. In summer, the content of biological impurities in such water quality is also quite large, and a large amount of algae impurities will gradually be produced. It is easy to cause blockage of pipelines and heat exchange equipment, which seriously affects heat exchange efficiency and safe operation of heat exchange equipment. □

[0007]

⁵³ As the prior art of the present invention, the full text of the ZL200910157474.6 Chinese invention patent is cited as a part of the description of the present invention for easy understanding. □

[0008]

⁵⁸ Contents of the invention

[0009]

⁶² The technical problem to be solved by the present invention is: on the basis of the Chinese invention patent of ZL200910157474.6, named "ultrasonic full-effect anti-scaling and descaling, sterilizing and algae-killing, oxygen-removing device", add A special rare-earth material is used, and the rare-earth material generates a unique power after being applied with a DC voltage and transmits it to the scaled water pipe wall and the water flowing through the water pipe.

⁶⁷ In this way, it solves the problem of descaling and anticorrosion of long-distance process equipment in the injection-production system, and effectively plays the role of oil displacement, plugging removal, sterilization and algae killing.

⁷⁰ The invention provides a DC voltage circuit and a device for unblocking, descaling and algae killing using the DC voltage circuit.

[0010]

⁷⁵ Technical solutions □

[0011]

⁷⁹ A DC voltage circuit is characterized in that it is composed of a power transformer, a rectifier bridge block, a

filter circuit, a three-terminal adjustable integrated voltage stabilizer, and a control resistance-capacitance component, etc., and its output terminal outputs DC to the liquid phase amplifier. After the positive and negative poles of 15 (electrode rods), they are connected to the water inlet pipe of the fouling equipment through the pipe joint. □

[0012]

⁸⁷A DC voltage circuit, characterized in that the AC voltage output by the power supply voltage through the transformer T1 is rectified by the rectifier bridge block, and the output DC voltage is filtered by the capacitors C1 and C2 connected in parallel, and then added to the three-terminal adjustable integrated voltage regulator. The block 52 terminal is finally output to the positive and negative poles of the liquid phase amplifier 15 through the parallel capacitor C4 with the capacitors C1 and C2. □

[0013]

⁹⁵A device for unblocking, descaling, and algae elimination using the aforementioned DC voltage circuit, characterized in that the device for unblocking, descaling, and algae elimination using the DC voltage circuit further includes a host (1), at least one Magnetically to the transducer (2), the ultrasonic electric signal output by the host (1) is plugged into the socket (5) of the magnetic transducer (2) through the cable (3), plug (4), and the host (1) has a built-in There are ultrasonic signal source, power amplifier (rare earth material) and said DC voltage circuit connected in sequence. □

[0014]

¹⁰⁴The positive effect that the utility model obtains is: □

[0015]

¹⁰⁸1. The effect of anti-scaling and descaling is good, which solves the problems of descaling and anti-corrosion of long-distance process equipment in the injection-production system, and effectively plays the role of oil displacement, plugging removal, sterilization and algae killing. □

[0016]

¹¹⁴2. It saves equipment descaling and maintenance funds, avoids equipment corrosion, and prolongs the service life of equipment. □

[0017]

¹¹⁹3. The device is small in size, light in weight, low in power consumption and easy to install. □

[0018]

¹²³4. The ultrasonic frequency range is wide from 35KHz-60KHz, which can meet the needs of water descaling in different media. After adjustment, it has the best ability of descaling, anti-corrosion, oil displacement and blockage removal. □

[0019]

¹²⁹5. In the circuit, the frequency is changed by changing the reference voltage of the comparator in the IC chip to ensure that the resistors, capacitors, and semiconductor components work at an ambient temperature of -30° C-65° C, thereby stabilizing the oscillation frequency. □

[0020]

¹³⁵6. Oil flooding and plugging removal have obvious effects, which can reduce energy loss and improve the safety and economy of the injection-production system. □

[0021]

¹⁴⁰Description of drawings

[0022]

¹⁴⁴Fig. 1 is a schematic appearance diagram of an embodiment of the present invention. □

[0023]

¹⁴⁸Fig. 2 is a schematic diagram of the structure of the magnetic transducer. □

[0024]

¹⁵²Figure 3 is a schematic diagram of the ultrasonic signal source and power amplifier circuit. □

[0025]

¹⁵⁶Figure 4 is a schematic diagram of the control circuit of the magnetic transducer. □

[0026]

¹⁶⁰Fig. 5 is a circuit diagram of the DC voltage circuit of the present invention. □

[0027]

164 Fig. 6 is a schematic structural view of an electrode rod filled with a special rare earth material according to the present invention. □

[0028]

169 detailed description

[0029]

173 A device for unblocking, descaling and algae killing using a DC voltage circuit, including a host 1, a magneto-induced converter 2, and a liquid phase amplifier 15.

175 The host 1 is provided with an ultrasonic signal source, a power amplifier and a DC voltage circuit.

176 The DC voltage circuit is formed by sequentially connecting a power transformer, a rectifier bridge block, a filter circuit, a three-terminal adjustable integrated voltage stabilizer, and a control resistance-capacitance component, and its output terminal outputs a direct current to the positive and negative terminals of the liquid phase amplifier 15. Finally, it is connected to the water inlet pipe of the fouling equipment through the pipe joint.

[0030]

184 Referring to Figure 5, the power supply voltage (220V) outputs 18V AC voltage through the transformer T1, and this voltage is rectified by the rectifier bridge block to output a DC voltage of about 25V, which is filtered by capacitors C1 and C2 and added to terminal 52 of the three-terminal adjustable integrated voltage regulator block, Adjust the resistance of the potentiometer RW1 to adjust the output voltage V0 value.

188 The integrated voltage regulator has the advantages of small size, high stability, small output impedance, and good temperature performance.

190 In order to fully ensure the stable operation of the three-terminal integrated voltage stabilizing block, the smaller the pressure difference between the voltage stabilizing blocks 51 and 53 within the allowable range, the better.

193 The integrated voltage regulator block should have enough heat dissipation area, and the resistor R1 should be as close as possible to the voltage regulator block or directly welded between 51 and 53 of the voltage regulator block to ensure the output voltage regulation accuracy.

196 Otherwise, when the current at the output terminal is large, an additional voltage drop will occur, which will affect the accuracy of the output voltage.

198 The grounding point of RW should be the same as the return point of the load current, and the resistor R1 potentiometer Rw should choose a resistor with higher precision.

200 After actual debugging, the power supply voltage is $220V \pm 20\%$, the load current is from 0.1A to 3A, and the output voltage remains basically unchanged.

[0031]

205 Output the DC positive and negative electrodes to the liquid phase amplifier 15 (electrode rod) and then

connect to the water inlet pipe of the fouling equipment through the pipe joint.

207 Due to the high water pressure in some pipelines in actual use, in order to ensure safe operation and use effect, we adopt the structure and installation method in Figure 6.

[0032]

212 67 in Fig. 6 is a pipe joint with a small flange matching with the user's pipeline. A small terminal 61 connected to the positive electrode output by the main engine is welded on the outer wall of the pipe joint, and a stainless steel rod or pipe of about $\Phi 25$ is welded on the pipe wall.

215 The rod or tube is connected to the positive pole of the power supply through the tube wall.

216 The position of the stainless steel rod or tube should be parallel to the tube wall on the inner axis of the tube.

217 Pipelines 65 and 66 are flowing water pipes of fouling equipment, and pipeline 66 is welded with a small binding post 62 connected to the output negative electrode of the main engine.

219 The flange fixing bolt holes of pipelines 65, 66 and small flange 67 are 68, and 64 is an insulating spacer between 67 and 65, 66, which should have sufficient thickness and insulation strength.

221 The set screw is insulated from the flanges of 65, 66, 67.

222 Ensure that the positive and negative electrodes output by the main unit cannot be short-circuited or seriously leaked.

[0033]

227 Referring to FIG. 3, the ultrasonic signal source circuit includes an integrated circuit IC, resistors R1-R4, capacitors C1 and C2, and a potentiometer Rw.

229 The IC is an integrated circuit 556, the pin (7) of the IC is grounded, the pin (3) is grounded through the capacitor C2, the pins (4), (10) and (14) of the IC are connected to the positive pole, one end of the resistor R1 is connected to the positive pole, and the other end is connected to the positive pole. One end is connected to pin (13) of IC, and pin (13) of IC is connected to one end of resistor R2, and the other end of resistor R2 is connected to pin (12) and pin (8) of IC, and grounded through capacitor C1.

234 The adjustment of the potentiometer Rw is connected with the pin (11) of the IC, and the other two ends are respectively connected with resistors R3 and R4, the resistor R3 is connected to the positive pole, and the resistor R4 is grounded.

237 The pin (2) and pin (9) of the IC are connected as signal output terminals.

238 The time base circuit inside the IC forms a multi-frequency oscillator with resistor R1, resistor R2, and capacitor C1. Its frequency is $f = 1.44 / (R1 + 2 R2) C1$. It is required to select resistor R1, resistor R2, and capacitor C1 during circuit design. Appropriate value, make its oscillation frequency around 47.5KHz.

241 The IC also includes a comparator. The reference voltage of the comparator in the IC is adjusted and controlled by the potentiometer Rw and the resistors R3 and R4 to adjust the resistance value of the potentiometer Rw. The oscillation frequency of the circuit can be from 35KHz to 60KHz. Depending on the oily impurities in the medium, the ultrasonic frequency required for thorough removal is also different, and it can be adjusted at any time according to the usage.

[0034]

²⁴⁹ The combination of the ultrasonic (square wave) electrical signal output by pin (2) and pin (9) of IC of this circuit and related circuits, including integrated circuit IC 1, frequency divider IC 2, frequency divider IC 3, integrated circuit IC 4, IC 5, IC 6, is a flip-flop, a NAND gate, a NOR gate circuit, and also includes six inverters IC 7 and an integrated chip 555 adjustable intermittent pulse circuit.

²⁵³ Pin (2) and pin (9) of IC are connected to pin (13) of IC 1, and pin (5) of IC 1 is connected to pin (11) of IC 2.

²⁵⁴ Pin (12) of IC 1 is connected to pin (3) of IC 4.

²⁵⁵ Pin (14) of IC 2 is connected to pin (6) and pin (2) of IC 4.

²⁵⁶ (2) feet and (3) feet of IC 2 are connected to (2) feet and (13) feet of IC 6 and (12) feet of IC 5.

²⁵⁷ Pin (14) of IC 3 connects pin (5) of IC 6, pin (9) of IC 4, pin (8) of IC 3 connects pin (4) of IC 6, pin (3) of IC 7.

²⁵⁸ Pin (2) and pin (3) of IC 3 are connected to pin (8) of IC 7.

²⁵⁹ Pin (8) of IC 4 is connected to pin (13) of IC 6, pin (11) of IC 4 is connected to pin (5) of IC 5.

²⁶⁰ Pin (6) of IC 4 is connected to pin (9) of IC 5.

²⁶¹ Pin (1) of IC 5 is connected to pin (3) of IC 6, pin (2) of IC 5 is connected to pin (11) of IC 6, pin (6) of IC 5 is connected to pin (1) of IC 7. Pin (6) of IC 6 is connected to pin (9) of IC 7, pin (1) of IC 6 is connected to pin (4) of IC 7. The (13) pin of IC 7 is connected to the (3) pin of the integrated chip 555, the (1) pin of the integrated chip 555 is grounded, its (5) pin is grounded through the anti-interference capacitor C 0, and its (6) pin is respectively connected to the negative pole of the diode D 1 and The positive pole of the diode D 2 is grounded through the capacitor C 4, the negative pole of the diode D 2 is connected with the positive pole of the diode D 1 through the coaxial potentiometer R6, and the positive pole of the diode D 1 is respectively connected to (8) feet and (4) Foot connection. The output terminal of pin (3) of integrated chip 555 is connected with pin (13) of IC 7, and the output period is from 10MS to 30MS square wave signal that can be adjusted at will.

[0035]

²⁷⁴ Further referring to FIG. 3, the power amplifier is composed of a circuit consisting of a power transistor IGBT 1 and its driving circuit, and a circuit consisting of a power transistor IGBT 2 and its driving circuit.

²⁷⁶ The driving circuit of the power transistor IGBT 1 includes a capacitor C 7, a resistor R11, a resistor R12, a resistor R10, a transistor T3, a transistor T4, a diode D3, a diode D5, a transformer B and a coil L1. One end of capacitor C 7 is connected to pin (6) of IC 7, the other end is connected to the base of triode T3, and grounded through resistor R10. Capacitors C 7 and C 10 form an integral circuit. The emitter of the transistor T3 is connected to the base of the transistor T4. The collectors of the transistors T3 and T4 are connected to one end of the primary coil of the transformer B, and the other end of the primary coil is connected to the power supply voltage V C C. The collectors of transistors T3 and T4 are connected to the other end of the primary coil of transformer B via diode D3. One end of the secondary coil of the transformer B is connected to the emitter of the power transistor IGBT 1, and the other end is connected to the gate of the power transistor IGBT 1 through the resistor R11. The emitter of the power tube IGBT 1 is connected to the coil L1, and connected to one end of the secondary coil of the transformer B1 through the capacitor C 6. The coil L1 is wound on the left cylinder 10 of the iron core 6 of the magnetic transducer 2. The power tube IGBT 2 and its driving circuit are the same in structure as the power tube IGBT 1 and its driving circuit. The driving circuit of the power tube IGBT 2 includes capacitor C 8, resistors R13-R15, transistor T 1, transistor T 2, diode D6,

diode D4 and transformer B1, capacitor C8 One end is connected to pin (2) of IC 7, the other end is connected to the base of triode T1, and grounded through resistor R13. Capacitor C8 and resistor R13 form an integral circuit. The emitter of the transistor T1 is connected to the base of the transistor T2. The collectors of the transistors T1 and T2 are connected to one end of the primary coil of the transformer B1, and the other end of the primary coil is connected to the power supply voltage VCC. The collectors of the transistors T1 and T2 are connected to the other end of the primary coil of the transformer B1 through the diode D6. One end of the secondary coil of the transformer B1 is connected to the emitter of the power transistor IGBT2, and the other end is connected to the gate of the power transistor IGBT2 through the resistor R14. The collector of the power transistor IGBT2 is connected to the coil L2 and the capacitor C6, and the coil L2 is wound on the right column 11 of the iron core 6. Except the coils L1 and L2, other electrical components are in the host.

[0036]

³⁰⁴ Referring to FIG. 2 and FIG. 4, the magnetic transducer 2 includes a protective cover 7, an iron core 6, a socket 5, and a vibration transmission rod 9.

³⁰⁶ The iron core 6 is contained in the protective cover 7, the socket 5 is fixedly arranged at the rear end of the protective cover 7, and the vibration transmission rod 9 is installed at the front end of the protective cover 7. A plurality of annular cooling fins 8 are fixed on the vibration transmission rod 9.

[0037]

³¹² Because the power tube IGBT is in the main circuit position, its collector is directly connected to the load and has a higher working voltage.

³¹⁴ However, the pulse drive signal amplified by the high frequency composite tube has an independent power supply with low operating voltage, so the pulse drive circuit transmits the drive signal indirectly through the isolation pulse transformer B. The pulse transformer adopts manganese-zinc magnetic tank with high magnetic permeability and low loss. The magnetic tank pulse transformer has small magnetic flux leakage, and the frequency of transmission pulse can be higher (generally up to 100KHz).

[0038]

³²² In addition, the operating frequency of the device is relatively high, and the driving current required by the power tube IGBT itself is very small, so the volume of the pulse transformer can be made very small.

³²⁴ The secondary side of the pulse transformer is connected to the gate of the power transistor IGBT through resistors R11 and R12. Resistor R11 and resistor R12 prevent the grid of the power tube IGBT from being open, and provide a charging and discharging station. The diode connected in parallel with the resistor R11 is an accelerating diode, which increases the current charging the grid of the power tube IGBT, thereby increasing the switching speed of the power tube IGBT.

[0039]

332 The ultrasonic (square wave) electrical signal output by pin (2) and pin (9) of this circuit IC is combined with the above circuit, amplified by the power device, and converted from electrical energy into mechanical energy by the magnetic transducer, and the output frequency is from 35K H z- 60K H z 10-wave head interval 80MS pulse vibration, with a larger power range and stronger sound intensity.

336 Select 35K H z-60K H z pulsed ultrasonic waves as the frequency of use of the anti-scaling device, which is specially used to remove hard salt in the water medium, but also the scale formed by the injection-production pipeline and the heat exchange equipment containing a large amount of oil pollution. The selection of the ultrasonic frequency with a wide range of 35K H z-60K H z is based on the difference of oily impurities in the medium water, and the ultrasonic frequency required for the best removal effect is also different. The key component of this device is the magnetic transducer, which has high requirements on the ultrasonic frequency generated by the circuit, while the resistance, capacitance, and semiconductor devices of the oscillation circuit change with the ambient temperature, and their resistance and capacitance also change accordingly. Temperature sensitive components, and the working environment temperature of the device is -30° C -65° C. In order to ensure the stability of the oscillation frequency, the mutual compensation of temperature should be considered when selecting the resistance and capacitance; the other is to change the reference voltage of the internal comparator of the integrated circuit IC block to change the frequency, so as to ensure the change within the ambient temperature; another Because the magnetic transducer is directly installed on the surface of the boiler and heat exchanger, the surface has a certain temperature, which can be as high as 70° C -100° C. The core of the transducer will also generate heat when the coil flows through the high-frequency pulse current, so the transducer itself should have good heat dissipation performance. The transducer transmission rod of this device has cooling fins and is designed for this purpose. Because the iron core also has a certain temperature and works uninterrupted all year round, the coil is wound with high-temperature wire.

[0040]

358 The iron core is connected with the transmission rod by silver brazing. In order to ensure the welding is firm, the silver copper will inevitably infiltrate into the iron core. In order to ensure that the iron core at the welding end does not increase the magnetic resistance, the width of the iron core welding surface should be increased by 2mm.

362 The socket used for connecting the transducer to the host can also be a high-temperature plug and socket to fully ensure the stable and reliable operation of the device.

[0041]

367 Although the present invention has been described in connection with preferred embodiments, it is to be understood that modifications thereof within the principles outlined above will be readily apparent to those skilled in the art, and that the present invention is therefore not limited to the preferred embodiments described but rather is intended to include this modification.

371 The invention resides in each novel feature and each combination of features. Reference signs in the claims do not limit their protective scope. Use of the verb "to comprise" and its conjugations does not exclude the presence of elements not stated in the claims. Use of the article "a" or "an" preceding an element does not

exclude the presence of a plurality of such elements.

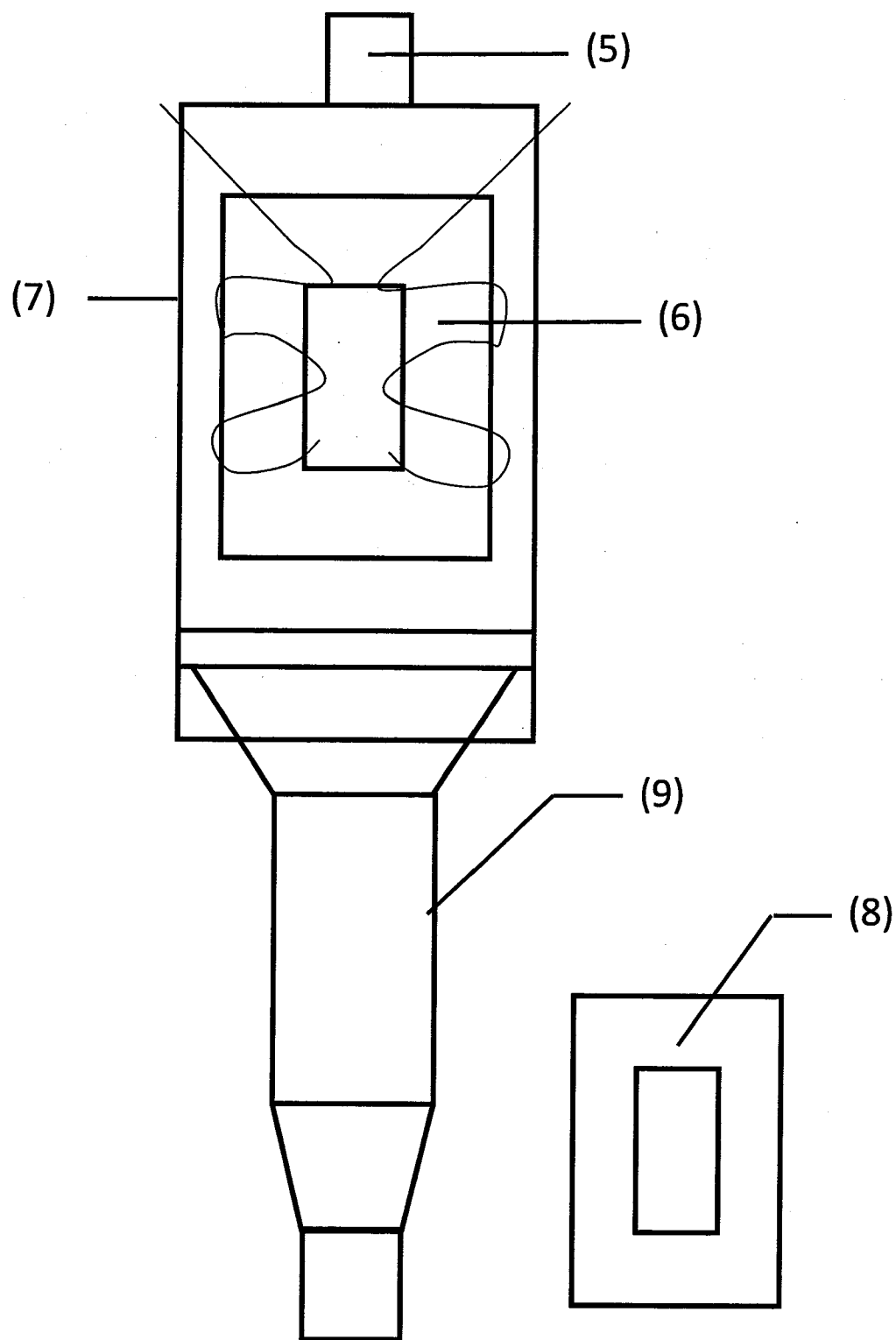


图 2

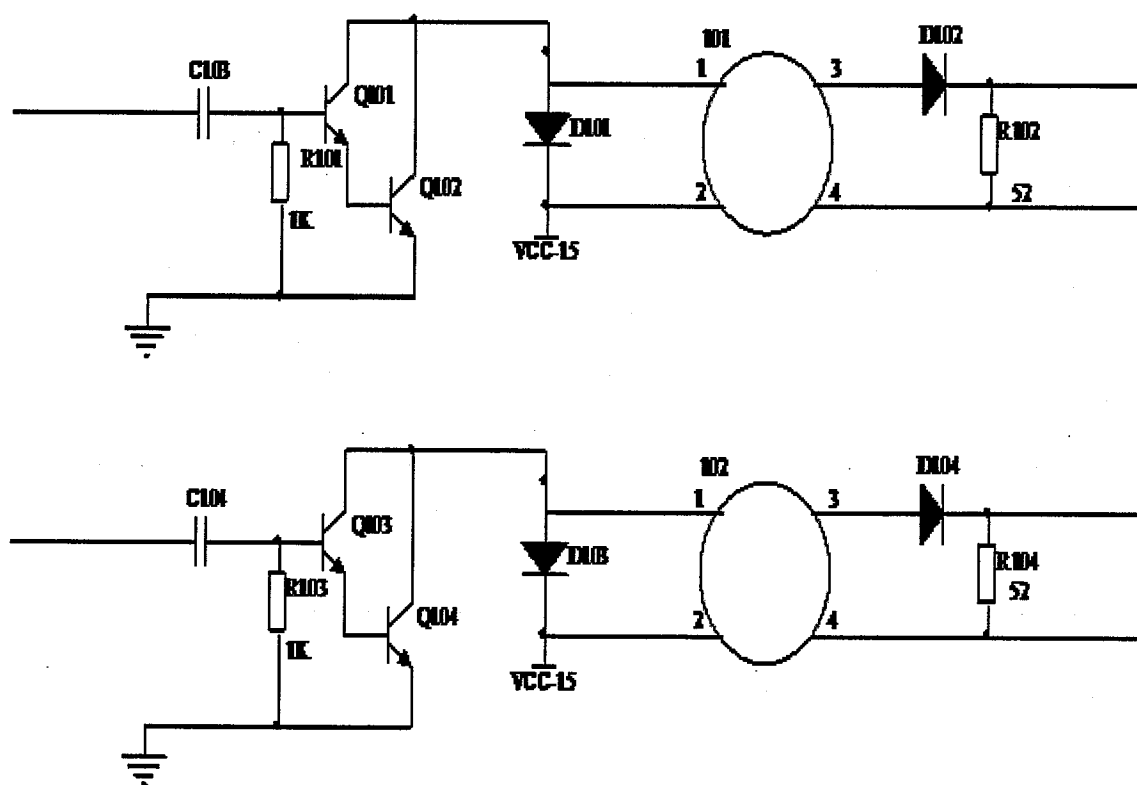


图 4

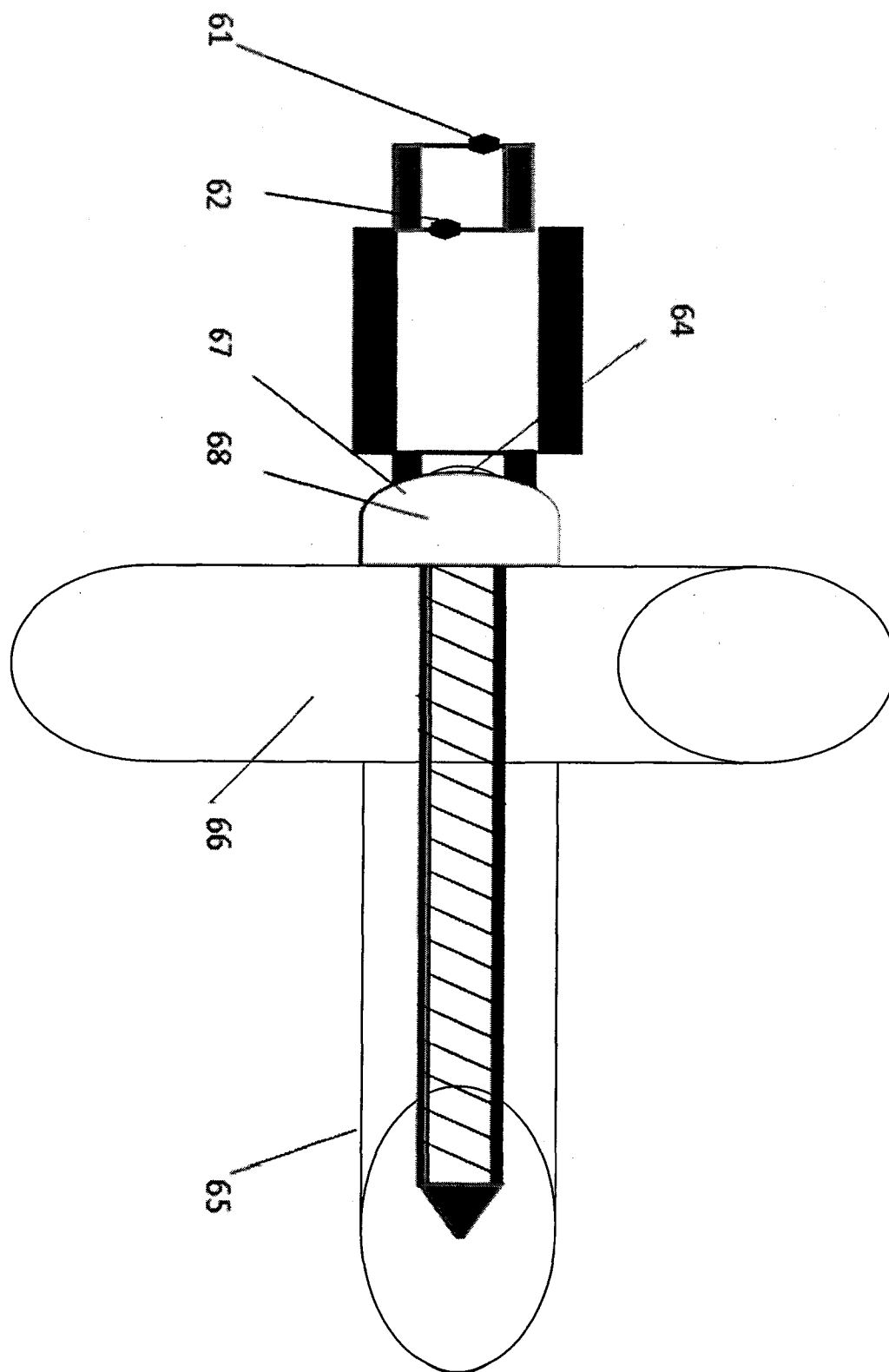


图 6